THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. APRIL 18, 1895. CHICAGO, ILL. NUMBER 16.

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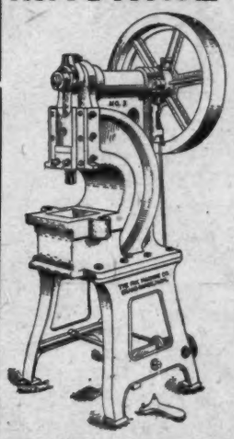

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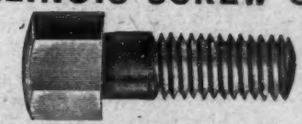

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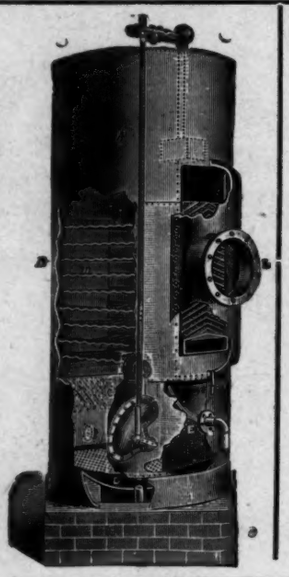

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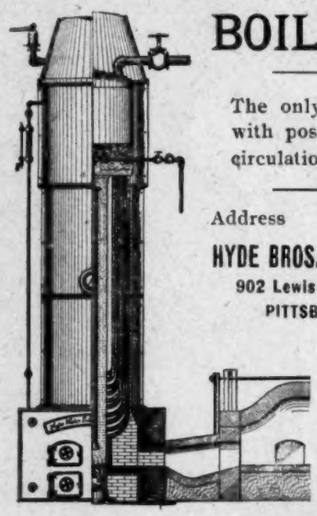

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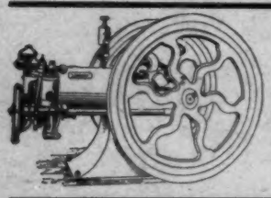

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. APRIL 18, 1895. CHICAGO, ILL. NUMBER 16.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The movement continues toward improved conditions in the iron trade. In some parts of the market the restricted buying caused by advancing prices, has given place to moderate activity. This has been particularly noticeable in Bessemer pig iron. The Pittsburg price, under continued buying has gone to $10.85 and a contract for the third quarter of the year is reported at $11 25 Pittsburg. A careful rounding up of recent ore buying shows a total not much below 5,000,000 tons, counting in the amounts that will be taken by furnaces interested in mines. Mesabi Bessemers, outside of the most desirable ores, seem destined to be crowded down to a very low basis. Some sales have been made as low as $2.00 and the scramble has only fairly begun, the total of Mesabi sales thus far being something over 1,000,000 tons. The situation as to pig iron other than Besssemer has not changed in the week. Though there is firmness among producers of foundry iron and sales are made with less difficulty at quoted figures than for some time past, there is very little business at an advanced price. In the Eastern market Northern furnaces supplied with Connellsvill coke find Southern competition very keen; but for this fact Northern brands would probably be higher. The production of coke iron is at nearly the same rate as in March and stocks are stationary. When buyers who have gone from hand to mouth for 18 months appreciate that the time to change that policy has arrived and that the day of lowest prices is at an end, the concurrent buying to cover future wants will undoubtedly result in a distinct advance. There are indications that some buyers have decided to make contracts for the future, and there are indications likewise that many others are sticking to their old habit. There is one fact in addition to the higher prices for coke and iron ore, which is having consideration in this connection: Coal, which has seemed to be incapable of taking any part in an upward movement, may be helped by the rapid advance in oil. A larger demand for coal as fuel, where it has heretofore been displaced by oil, may add another increment to the swelling cost figure of the manufacturer. In finished iron and steel the week has brought evidence of increasing firmness. The size of the advance in bar iron is now known, being about $2.00 a ton from the old basis, and it does not appear that buyers are disposed to contest the effort to get the business out of its notorious demoralization. Billets share only in part the advance in Bessemer pig iron. At Pittsburg, sales have been made at $15.75. The Cleveland district shows no great activity, but prices are from 25 to 50 cents below Pittsburg. Eastern sellers hold firmly for $17.75 at Philadelphia, but buyers wait. The demand for light sheets is strong and there is a prospect of an agreement by makers on a higher basis. Wire and wire nails are less active.

THE CLEVELAND OUTLOOK.

Ore buying has continued in the past week and several furnace firms whose requirements range from 100,000 to 200,000 tons have been in the market. It is found by the later comers that some of the standard ores are completely sold up. This is the case with two important mines on the Menominee range and two equally well known producers on the Gogebic. The earlier buyers, who took the bulk of old range Bessemers, filled out their requirements in some cases with the lower-priced Mesabi ores of Bessemer grade, the price on the latter being $2.00 in one instance. The inference that the higher priced Mesabi ores would be neglected seems hardly borne out by later developments. It would be difficult to secure to-day from any one seller enough standard ores to form the base of a Bessemer mixture, and this place will be filled for some furnacemen, at least, by the more expensive Mesabi ores. Sales of Biwabik and Franklin have been made at the prices which have been asked for them. It is evident that the competition on the other ores of the new range, in view of minimum royalty requirements, will be sharper than in '94, and certain furnace companies interested in Mesabi mines have found it advantageous to buy from other producers, in view of the attractive prices some have named. The competition between the leading interests to ensure tonnage for their railroads, bids fair to give the average independent producer exceedingly close figuring The past week has seen some additional ore chartering at 80 cents from the head of the lake to Nov. 1, the covering of a block of ore from Marquette at 65 cents to Oct. 1, and a rate of 40 cents from Escanaba on first trips.

Pig Iron. The advance in Bessemer pig has continued in the week, while a 5,000-ton sale is recorded at $10.15 valley furnace, May and June delivery. While few makers are willing to sell for less than $10.25, a sale of 2,000 tons was made less than a week ago at $10, indicating some variance in views. Few furnaces will consider contracts for the third quarter of the year, and it is questionable if the Pittsburg sale for July, August and September delivery at a figure equivalent to $10.60 in the valley could be duplicated in view of the uncertainty about coke. It is intimated that the next move of the operators will be to put the price to $1.50, but this will not come, at least, until $1.35 is established. In the past week some sales have been made at $1.20. Meantime there are rumors of efforts to get the coke producers together. The same obstacle is likely to be encountered, however, that came up late in '94, when a similar attempt was made. In foundry iron there is continued firmness in prices, but no increased buying. A few sales were made ten days ago at a figure covering the advance in coke. In charcoal iron a 1,500-ton sale is reported in the local market. The price varies little from the $12.50 quotation. This has been shaded lately, however.

Finished Material. Better inquiry in the more important steel products has been noted in the week, with a greater firmness in prices and in the case of angles and plates an advance of from $1 to $2 a ton. The outlook is materially improved. On beams and channels demand is fair at unchanged prices. In sheets, particulary the lighter gauges, there is increasing activity and mills are finding it difficult to meet their engagements. Bar iron, as noted elsewhere, has advanced $2 a ton and is held at 1c valley mill for common. Orders are coming in more freely and mills are more fully employed.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The week has been devoid of any events of peculiar interest, but the general feeling is one of confidence in the future and firmness as to prices. Pig iron did fully as well as for some time, in fact orders seem to be more frequent every week. Bar iron prices were settled at the Cleveland meeting last week, in a manner that seems to be satisfactory to all the mills. Rails, billets and rods are rather quiet, but the outlook is as good as a week ago. Structural material is in excellent demand, and orders for the past fortnight have been fully 10 per cent greater than for the two weeks before. Plates and merchant steel continue in good inquiry, and satisfactory sales were made last week. It is reported that a meeting of the sheet manufacturers is scheduled for the near future, and it is thought that at this meeting some endeavor will be made to put prices on a paying basis, as has been done with bars.

PIG IRON.—Orders in the past week have been frequent, and have aggregated fully as much as in the week previous. In local iron an excellent business has been done, although most of it was in small lots. Only one order of 1,000 tons was taken, and several of 500 tons each. The demand is still large, and prospects are good for a good business for the next few weeks. While some buyers seem inclined to put off their purchases as long as possible, waiting to see if the advanced prices are not cut, the large majority seem satisfied that the stand taken by the furnaces is to be maintained, and are coming into the market to buy. It seems probable now that the view of these latter concerns will be sustained, as the market is strong, and seems likely to be higher in the future rather than lower. Southern iron also has done very well, sales being larger than in the week previous. One sale of 1,500 tons was made recently, and several of from 500 tons down were made in the last week. From the inquiry still being received it would appear that buying will continue to be heavy for some time to come. Prices on Southern iron are firmly maintained by the furnaces, although charges are made that some of the sales made recently were closed at figures a little under open quotations. While this may be true in one or two instances, it is also true that all the furnaces are well sold up for some time to come, and are consequently not in a position to make low prices at the present time. It is not likely that the lowest prices made recently will be duplicated in the near future. Quotations are now made as follows:

Lake Sup Charcoal.....	$13 00@13 50	Southern No. 2 Soft.....	$ 9 75@10 00
Local Coke Fdy. No. 1...	10 50@10 75	South'n Silveries No. 1.	11 75@12 00
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Local Coke Fdy. No. 3...	9 75@10 25	Jackson Co. Silveries...	15 00@16 00
Local Scotch Fdy. No. 1.	10 50@10 75	Ohio Silveries No. 1.....	14 00@14 50
Local Scotch Fdy. No. 2.	10 25@10 50	Ohio Silveries No. 2.....	13 00@13 50
Local Scotch Fdy. No. 3.	9 75@10 25	Ohio Strong Softeners...	13 00@13 50
South'n Coke No. 2.....	10 00@10 25	Alabama Car Wheel.....	17 50@18 00
South'n Coke No. 3.....	9 50@ 9 75	Malleable Bessemer.....	11 25@11 00
Southern No. 1 Soft.....	10 00@10 25	Coke Bessemer	11 50@12 00

BARS.—The plan outlined in this column last week was the one, substantially, adopted at the Cleveland meeting, and quotations are now made as follows: Eastern territory, 1c for common iron; Central territory, 1.05c; Western territory, 1.10c. These prices are made at points where there is a mill, and at other points the freight rate from the nearest mill is added. Sales in Chicago last week were only fair, and almost all in small lots. The largest order placed was for 300 tons, by a car works. Some of the large buyers seem disposed to wait to see if the mills do not weaken from their action at the Cleveland meeting, but there are indications that if present quotations are changed it will only be to make them higher. Guaranteed iron is now quoted at 1.20c to 1.25c; steel bars from strictly billet stock at 1.20c to 1.25c.

RAILS AND TRACK SUPPLIES.—The past week has been rather quiet as regards sales, but the inquiry is still good, and the outlook for future business excellent. Prices are made at $23 to $25 for rails; splice bars, 1.20c to 1.25c; track bolts, 1.95c to 2c; spikes, 1.65c to 1.70c.

BILLETS AND RODS.—Only a few small orders were taken last week for either billets or rods. Quotations are unchanged at $16.50 for billets, and $23 to $23 50 for rods.

STRUCTURAL MATERIAL.—No large business was done, but the number of small orders increases every week, and the aggregate tonnage placed is also larger. One or two good orders for building material for office buildings in outside towns were placed last week, and some bridge orders were given. Quotations are as last reported. Beams and channels, 1.45c to 1.50c; angles, 1.35c to 1.40c; plates, 1.40c to 1.45c; tees, 1.70c to 1.75c. Small orders from stock are placed at ¼c to ½c higher.

PLATES.—The market is in excellent condition, and the demand appears to be increasing. A number of good sized orders were placed last week. Prices are as follows: Tank steel, 1.25c to 1.35c; flange steel, 1.50c to 1.75c; firebox steel, 2c to 5c. boiler tubes 77½ to 75 per cent discount.

MERCHANT STEEL.—The call for this class of material is still large, and considerable sales were made in the past week. Prices are firmly maintained as follows: Open-hearth spring, tire and machinery steel, 1.50c to 1.60c; smooth finished tire and machinery, 1.50c to 1.60c; Bessemer bars, 1.35c to 1.40c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SHEETS.—The black sheet mills do not appear anxious for orders calling for long delivery, possibly because they are waiting to see if anything comes of the proposed meeting of the mill men, which it is said will be held in the near future at Pittsburg. The success of the bar men in forming an association and advancing prices to a living basis has encouraged the sheet mills to think they can do likewise. At present, prices are unchanged, and are made at 2.25c to 2.30c for No. 27 common iron, and 2.35 to 2.40c for sheet steel. Galvanized iron is in good demand, and is selling at 70 and 10 and 10 per cent off.

OLD RAILS AND WHEELS.—There does not appear to have been any large movement of old material of any kind, and prices are nominally as follows: Old iron rails, $10.75; old steel rails, $7.50 to $9 50, according to length; old wheels, $9.

SCRAP.—Sales of scrap have been limited, and the demand is a little lighter than last week. Quotations are unchanged, as follows: Railroad forge, $8.50 to $9; dealer's forge, $7; No. 1 mill, $6 50; No. 1 machinery, $7; axles, $12 to $12.25; cast borings, $3.50; wrought turnings, $5.25; axle turnings, $6.25; mixed steel, $5; heavy cast, $7 to $7.25; stove plates, $5 to $5.25; heavy melting steel, $7 to $7.50.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. There has been a considerable buying movement in Bessemer pig iron in the week ending April 17. Some variation has been seen in prices. While in one or two cases buyers were able four or five days ago to secure May and June iron at $10, valley furnace, the price is now 15 to 25 cents above that figure. One sale of 5,000 tons is reported at $10.15, valley furnace, and a Pittsburg sale of 2,000 tons is reported at $10.85. Some inquiry for later delivery is noted, and one transac-

tion is reported at $11.25, July, August and September. Very few sellers will contract for so long ahead. At present $10.25 is the seller's price in the valley. Billets have not been so active as Bessemer pig, and the advance in steel has not kept pace with that of Bessemer iron. Sales of billets have been made at $15.50@$15.75, and while most makers hold for the latter figure present requirements are not large and when buyers enter the market the price finally made is affected by the fact that steel works are supplied for some weeks ahead with iron bought at low prices. Foundry iron is practically unchanged. Forge continues firm and sales are reported at $9 25 and $9.35. Several buyers have been in the market and there are few furnaces in position to sell mill iron. Sheets have been in good demand and the mills are chary of orders for long deliveries at present prices, which are on the basis of 2.15c@2.20c for No. 27 common iron. Structural work is of fair proportions, with 1.20c still maintained as minimum for beams and channels. The outlook for the pipe trade is improving daily with the new activity in the oil field and an active season of development work is ahead. Skelp iron is firmer, with an advance of about $1 a ton. The bar iron agreement in territory west of the Alleghenies appears to have been successfully carried through and prices are now on a basis of 1c for common iron in this market.

Cincinnati. The improved tone of the market continues. Buying is more free. Shipments are increasing in volume. Old orders, hung up because of foundries having no work, are returned to the active list. The feeling is general that the lowest point of the greatest depression known to the history of the iron trade, has positively been reached, and that contracts may now be placed without any danger of repeating the familiar experience of the past four years. The buying current is smaller in volume than it was in March, but wider in range. Two or three quite large buyers are in the market, but generally the transactions run in lots of one carload up to 500 tons. The interest of buyers is stirred to some extent by the speculative activity in other markets, and the advances already scored in petroleum, cotton, beef, leather, etc. But, in spite of this, the most conservative spirit prevails and very few orders are placed that are not to cover work actually taken or in sight. In the South there is a distinctly firm tone, and a rigid refusal to make any concessions from regular figures. The firmness is also increasing daily, under heavy sales, but there is no advance in quotations. In spite of the hopeful features above indicated, the situation is far from rosy. The railroads seem as far as ever from placing orders for needed supplies. Many foundries have less work in sight than a month or two ago. Values are on so low a range that from the ore digger to the finished product, it is a question less of making profits than of avoiding losses. A month or two of continued cheerful talk and growth of general business throughout the country, with good crop prospects, may clear the way for permanently better things.

Buffalo. The advance in prices asked by furnaces dependent upon Connellsville coke has restricted trade, to a considerable extent, in Northern iron seeking market in this field. Eastern producers have profited in a measure by this easing of competition and captured a larger share of the business going. There have, however, been fewer transactions than the average of two or three weeks past, buyers evidently waiting to see whether the new aspect has come to stay or is only a temporary condition.

LAKE SUPERIOR IRON MINES.

Ore has been received from the mines at nearly every upper lake dock and an active movement will follow as soon as it is assured that the docks can take care of the daily output of shipping mines without a return to stockpiling.

The Franklin has 100,000 tons on stockpile. Within the past week the first sales of 1895 ore have been made.

At the Mahoning Ore Co.'s property near Hibbing, 85,000 cubic yards of earth has been moved. Steam shovels will be set at work in another week. Preparations are making at Superior to receive shipments of ore from this mine by way of the Wright & Davis road and the Duluth & Winnipeg.

The incorporation at Duluth of the Elbe Iron Co., means another Minnesota Iron Co. connectional undertaking on the Mesabi. The incorporators are J. H. Chandler, E. L Merryman, C. W. Hillard, James Belden and L. T. Beecher, all of Chicago.

The men employed at the Lake Angeline East End mine struck last week for higher pay, making the claim that if a higher price was obtained for ore, wages should advance. Figures given them by the management showed that the average daily earnings had been $1.61 for the six months previous —a higher average, it was claimed, than at any other mine in Michigan. They were assured that they would be advanced as soon as the company was justified in so doing. Most of the strikers have gone back to work.

The Odanah Iron Mining Co., which is composed of a number of the principal stockholders of the Metropolitan Iron & Land Co., has taken a lease of the Palms mine at Bessemer, which was recently relinquished by the Penokee & Gogebic Co.'s receivers. The Palms is reported to have 150,000 to 200,000 tons of ore in sight.

The Wheat mine, on the Cascade range, has sold 40,000 tons of its ore, a non Bessemer high in silica. This insures its operation through the season.

An extension of the lens of ore worked at its East End mine has been found by the Pittsburg & Lake Angeline Co. The extent of the new ore body has yet to be determined; it ranges from 40 to 80 feet in thickness.

The Oliver's shipments this year will be almost entirely from the Lone Jack. It is the expectation that 350,000 tons at least will be mined.

Mining operations at Wakefield, Wis., were entirely suspended last year. Preparations are now under way for resumption at the Sunday Lake and Brotherton, baling being in progress under a joint arrangement. Work will be resumed also at the Davis, east of Wakefield.

Engines and skips are being put in place at the Sellers Ore Co.'s mine near Hibbing, Minn. A new shaft house is going up and a D. M. & N. spur is being built.

The leasing of the Swanzey has been put in the hands of A. W. Maitland, of Negaunee, by the Escanaba Land & River Improvement Co.

The Anvil Co. will operate its mine at Bessemer the coming season. The Eureka near Bessemer has closed down.

John T. Jones expects to make a considerable output of lean ores from the properties he has recently taken hold of at Iron Mountain. Sample cargoes will go to a number of furnace companies.

J. W. GEPHART, president of the Valentine Iron Co., Bellefonte, Pa., writes correcting the report started by a local paper, that the Nigh Bank iron mine will be abandoned. The shut down is temporary, pending changes that will permit of working adjacent territory. He says there is ore enough in Nittany valley east of Bellefonte to supply the Valentine furnace, and west of Bellefonte to supply Bellefonte furnace for the next 50 years, and adds that in the depression the furnaces at Bellefonte have made as full time as similar plants.

THE Northwestern car and machine shops, at Oshkosh, Wis., were sold, April 13, by order of the court to satisfy the claim creditors. Howard Jenkins, of Oshkosh, got the property for $22,000. The Niles Tool Works Co. was also an active bidder. These shops were built about two years ago and represent an investment of $150,000. Citizens contributed $25,000 cash and 25 acres of land. An effort will be made to get up a local company to operate the shops.

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

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APRIL 18, 1895.

THE NEW BAR IRON ASSOCIATION.

The result of the meetings recently held in Cleveland and Chicago, by representatives of iron mills west of Pittsburg was the formation in Cleveland last week of the Merchant Bar Iron Association. At the same meeting the following officers were elected: President, W. E. Taylor, of the Union Iron & Steel Co., Youngstown O.; vice-president, Major Collins, of the Central Iron & Steel Co., Brazil, Ind., secretary, Geo. M. Clark, of Mitchell, Trantor & Co., Cincinnati; treasurer, James Corns, of Joseph Corns & Son, Massillon, O.; executive committee, W. E. Taylor, Major Collins, Geo. M. Clark, W. Scott Bonnell, of the Mahoning Valley Iron Co., and Frank B. Felt, of the East Chicago Iron & Steel Co. Another meeting will be held at Cincinnati, May 7.

The action of the association relative to prices is about as outlined in these columns last week. Minimum prices were established by districts at 1c. for common iron between Toledo and Erie, at mills; 1.05c. from Toledo to Chicago, and 1 10c. from Chicago west. In all cases the freight to points at which there are no mills will be added to the above. Other questions are also within the purview of the association. Chief of the causes of demoralization, it is agreed, is the practice into which some buyers have fallen, under the stress of the depression, of neglecting contracts, or practically repudiating them. Having agreed to take a certain amount of material at a given price, within a given time, they sieze on every occasion for refusing to take out iron if meantime there has been a drop in the market price. In some instances there is no quibbling, merely the flat-footed declaration that the market is lower and unless the contract price is reduced no further specifications under it will be made. Part of the trouble has been, in addition to the unwillingness of sellers to go to law to enforce contracts, and lose their customers, that other manufacturers, even when they knew that contracts were being violated, have been too ready to supply the wants of the contract-breaker, in the hope of getting a permanent customer. It is understood that the members of the Merchant Bar Iron Association will be notified of cases in which contracts have been repudiated and that sales will not be made to such buyers until their contracts are fulfilled. There is no injustice in this arrangement; indeed it is a healthy reform that might well spread to other departments of the market. There is neither good morals nor good business in contract breaking, and buyers who live up to their agreements will view with satisfaction this united effort to hold to the same basis those who require outside pressure. No manufacturer should be asked to take all the risk of market variations, both on what he buys and on what he sells. He cannot get his raw material contracts changed to correspond with every fall in the market, and he cannot guarantee against any change in price those whose engagements with him are the basis of his contracts with others.

The effort of Western bar iron manufacturers to get to a living basis after so long a period of profitless operation, is only a phase of the movement toward sound business policy that is making some headway here and there. There will be skeptics who will only believe that they must pay better prices when they have gone up and down the market and failed to find a weak spot; but there are already signs of encouragement to the new regime from those who appreciate that a demoralized selling interest is not a benefit but an injury even to the market it supplies.

FUEL ECONOMIES IN IRON MILLS.

Iron manufacturers of the United States will be interested in the economies in the manufacture of bar, hoop and sheet iron, suggested at the recent meeting of the South Staffordshire, Eng., Institute of Iron and Steel Works Managers. The address of the meeting was by Ernest W. Harvey, Associate of the Royal School of Mines, and his suggestions were particularly in the line of furnace improvement and high fuel efficiency. The necessity for closer study of economies he found in the displacement of iron by steel and the consequent disproportion of iron manufacturing capacity and demand. The defects of the ordinary direct-fire furnaces so largely in use were pointed out to be the loss of fuel from maintaining the walls of the fire-place and of the neck and flue at practically the same temperature as the heating chamber, from radiation and convection of heat from the thin walls of the flue, and from imperfect combustion of coal gases; also loss of heat in waste gases due to inefficient boilers attached to the furnaces.

Much has been done in the United States in adding to the efficiency of rolling mill heating and puddling furnaces. There has been realized in recent years not a little saving in fuel, not only in puddling, but in reheating for bar and sheet mills, and in the annealing of iron and steel. The construction of heating furnaces has been changed to secure the concentration of the flame in the front of the furnace and to reduce the proportion of escaping flue gases. It is now not unusual to have the temperature of stack gases in the vicinity of 500°. The utilizing of waste gases by efficient waste heat boilers is the general practice, and the improvement in these boilers, in the United States, and their thorough employment of the escaping gases of puddling and heating furnaces, are matters of common knowledge.

Mr. Harvey's address summarized as follows the advantages of the new Siemens furnace, introduced by Mr. Frederick Siemens, of Westminster, in a number of iron works in England, as well as on the Continent:

1. The sensible heat of the gaseous fuel issuing from the separate gas-producers, and the heat formerly radiated from the incandescent fuel therein, is better utilized by making the gas-producer form part of the furnace structure itself.

2. The heat-giving power of the tar and soot formerly deposited in the cooling-tubes or long flues is applied directly in the heating chamber.

3. The loss of gas at each reversal of the flame current is

avoided, also the loss by escape of gas direct to the chimney through imperfectly-fitting valves.

4. The saving in fuel by returning a portion of the hot products of combustion to the fuel in the gas-producer, whereby the CO_2 contained in them was converted into CO.

It is plain enough that the exactions of labor unions are a serious handicap to English iron manufacturers in their efforts to compete with Belgian and German products. Whether the modernizing of plants and the introduction of economies in the use of fuel will offset higher wages is a question. Certainly it will go far toward retaining markets now slipping away. In the United States, the iron manufacturer's choice is between thorough modernizing of practice and equipment to compass every possible saving of fuel, or the entire abandonment of the business.

NOT only has the surprising rise in the price of oil benefited the iron trade in stimulating development work in Pennsylvania fields and bringing forward an active demand for well casing and drilling equipment of all descriptions, but the great bituminous coal industry that has suffered acutely and is still prostrated may be helped by the temporary decrease in the use of oil as fuel. Coal mining, already overdone in the United States, quickly felt the falling off in fuel requirements, as manufacturing operations shrunk under the panic's blight; and the restoration of normal demand has been as slow as the advance of manufacturing toward its old time volume. High-priced oil will reduce its use as fuel and will restore to the coal mines some of the trade they have lost in the period of cheap petroleum. It is surprising the number of developments that have been witnessed since the coming in of '95, each assisting in an unlooked for way to get an important industry upon a better basis. Wheat is well nigh alone in lingering in the old rut, without a sign of hope that the unexpected will come to it, also.

INTEREST in the establishment of a system for accurate test-bar determinations of the strength of cast iron only begins with the founder. The manufacturer who depends on another for his castings, and the buyer of the manufactured product who puts it to uses calling first of all for reliability and high efficiency, must be assured that the foundry routine has been such as to leave the smallest room for variations. The *Boiler Review* pertinently observes that

The subject of the tensile strength of castings in the foundry is of great importance to steam users in valve and fitting constructions. This strength is liable to variations for many reasons at the moment of pouring the metal. How many engineers at the present day blindly decide the efficiency of a boiler by the quantity and not by the quality of the heating surfaces? How common it is to here dirty and uncleanable flue surfaces several feet from the fire counted up at the same rate of efficiency as fire surfaces and vice versa?

FOR the first time in five years the production of pig iron in Great Britain in 1894 exceeded that of the United States. The total as reported by the British Iron Trade Association was 7,364,745 gross tons, against 6,657,388 tons in this country. In the preceding year the figures were 6,976,990 and 7,124,502 tons respectively.

The Largest Southern Producer of Pig Iron.

Some attention has been drawn recently by journals devoted to stocks, bonds, etc., to the showing of the Tennessee Coal, Iron & Railroad Co. The increase of the floating debt in 1894, is reported by one paper as less than $70,000. The Boston *Commercial Bulletin* says that for 1894 the interest on the bonded debt of $9,386,000 was earned but that there was a deficiency of $94,172 in meeting miscellaneous interest, dividends, etc. It adds:

"The company owns blast furnaces, coal mines, iron mines, foundries, etc., and coal and iron lands in Tennessee and Alabama. The total area of mineral lands and rights owned and controlled in 1893 was about 400,000 acres, of which 274,000 acres are in Alabama and 126,425 acres are in Tennessee. Of the latter, 58,135 lie in Cocke and Green counties, in the eastern portion of the State on the borders of N. Carolina. Blast furnaces Jan. 1, 1893, numbered 17, and daily output of coal 13,000 tons. On Dec. 19, 1892, the Cahaba Coal Mining Co, was absorbed, its property consisting of some 44,000 acres of coal and iron lands with an output of about 800,000 tons of coal per annum. An amalgamation with the De Bardeleben Coal & Iron Co. was consummated in September, 1892. Common stock authorized is $20,000,000. The amount outstanding was increased by $10,850,000 in 1892, to purchase the De Bardeleben, Cahaba and Excelsior companies, the amount now outstanding being $19,842,800.

Dividends have been paid as follows: On common, in 1887, 1 per cent, and none since. On preferred, from 1889 to 1893 inclusive, 8 per cent per annum; January, 1894, none; July, none."

The *Wall Street Journal* says: "The company seems to have discovered how to make a profit on iron and coal, with prices at the lowest ever known. The prospects are that the lowest prices have been seen in the iron trade for some time, and that with uninterrupted work this year the company will make some net profit after charges—probably enough to pay dividends on the preferred stock. The small increase in the floating debt was considered evidence of careful management and considerable strength. On the known facts of the iron trade it would have been no surprise if a company like Tennessee Coal had gone into receivers' hands last year." Interesting in the same connection is the statement of a director of the Tennessee Coal, Iron & Railroad Co. that it can make iron at less than $6 a ton and that it is getting a profit on all the iron and coal it sells.

British Investigation of Cheap American Steel.

J. S. Jeans, secretary of the British Iron Trade Association and editor of the *Engineering Review*, of London, is now in the United States in company with S. Price Williams, a British railroad expert, investigating steel production in American mills. Pittsburg and Cleveland will be visited among other points. Interviewed at New York, Mr. Jeans made this statement: "More steel can be purchased for a sovereign in the United States than in England, and I am desirous of learning the minutest reasons for that fact. The industry in this country is not so handicapped by trade associations as it is with us. In England those associations dictate terms to the manufacturers, and in case of non-compliance with the terms the producer is immediately boycotted. For some time the English production of iron and Bessemer steel has been practically at a standstill. Germany and Belgium are formidably rivaling us. Five years ago England had no competitors in this industry, but now Germany is making her product felt, especially in India, Australia and the colonies. Germany has more than held her position in steel production, although in India the duties are controlled by the imperial government. The method of production in Germany may be held largely responsible for this. The iron and steel mills there are constantly run to their full capacity, and when the home market has been supplied, the surplus is exported and sold for whatever price it will bring. England, of course, cannot meet such competition as that. Two remedies are suggested. One is to place the matter before the trade associations and endeavor to get labor to co-operate with capital, and the other is to induce parliament to interfere and make laws and regulations. These remedies will put England on her former footing with all her competitors."

The S. Freeman & Sons Mfg. Co., Racine, Wis., send out a new catalogue containing illustrations and descriptions of the horizontal, vertical, marine and firebox boilers made by them, together with their smoke stacks, tank and plate work, engines, etc. The catalogue also contains a chapter entitled "Our Methods," which partly explains the high reputation sustained by this concern for the quality of its products

THE BROWN GAS ENGINE.

For practical purposes, it may be assumed that all gas engines are worked on one of two systems or cycles, viz: the one receiving an impulse every two revolutions and the other receiving an impulse every revolution. With the former type the proportion and magnitude of the engine, compared with an engine in which an impulse is obtained at each revolution, must be as two to one; and there is the necessity for equalizing the power thus intermittently given off, by means of a heavy fly wheel. With the object of combining the advantages of both systems, the inventor developed and completed the engine now known as the Brown gas engine. In this engine, simplicity has been one of the principal objects sought. The aim of the designer in this regard will appear on referring to the accompanying illustrations.

Fig. 1 is a side elevation of the engine. Fig. 2 is the front. These drawings show all the working parts of the engine running with gas or gasoline. The operation of the engine is as follows:

The crank works in an enclosed chamber, the crank shaft projecting through boss bearings. On the upward stroke of the piston a vacuum is formed, which induces the flow of an explosive mixture into the crank chamber. The mixture is compressed by the descent of the piston, at which point it is transferred to the motor cylinder and compressed on the return stroke. Ignited at the upper dead center, the explosion forces the piston down. The exhaust, being opened before the

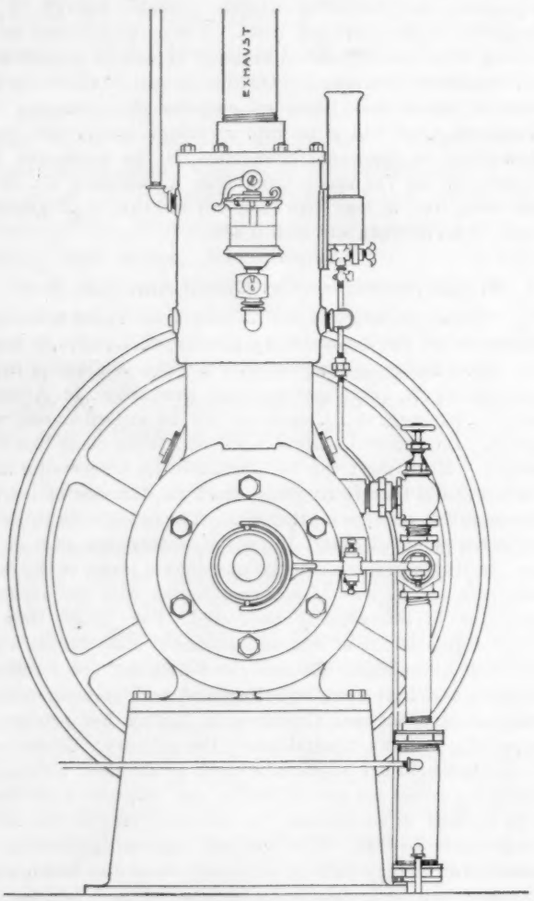

FIG I.

THE BROWN GAS ENGINE.

piston reaches the limit of its down stroke, reduces the charge to atmospheric pressure, before the incoming charge enters the motor cylinder. This operation is continued at each revolution. Thus with one piston and one cylinder, an impulse is obtained with every revolution.

The engine will run with equal facility and efficiency in either direction. Great speed is obtainable, there being no tappets, cams or levers, cog-wheels or belts. It is also claimed that the engine will operate very quietly and make use of a high percentage of the power generated, the high speed reducing the shock or jar to a minimum. The inventor lays stress upon these points: The small number of working points; the small space required; the fact that it will run in either direction without any alteration; that it is automatic in all its working; that it will operate with gas or gasoline without any alteration of its parts; its small weight, which makes it desirable where a heavy engine could not be used. Further particulars may be had from Allen W. Brown, 904 Olive st., St. Louis.

Lessening Coke Output.

From 165,505 tons, the high water mark reached by Connellsville coke ovens in the period of heavy production just before the advance in wages, the output fell to 158,506 tons in the week ending April 6, and is considerably less to-day. The shipments in the same week were 8,403 cars, a falling off of

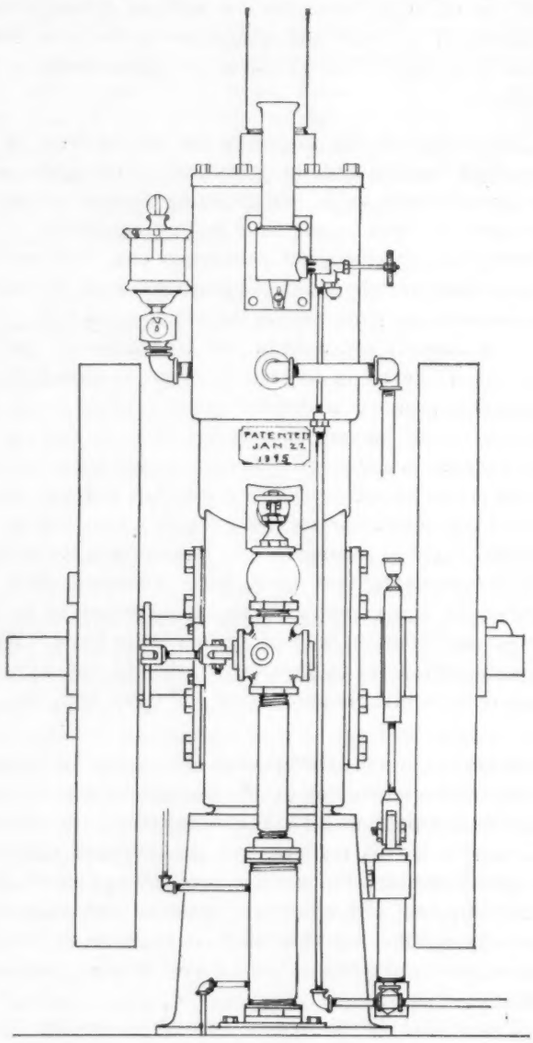

FIG II

THE BROWN GAS ENGINE.

761 cars from the preceding week. Furnacemen cut off their requirements where contracts expired with April 1, and at the advance to $1.35 a ton those who need to buy are contracting but sparingly. There are offers of coke at $1.20, deliveries in May and June, and these have tended to postpone engagements with the chief producing company on the new basis. There is a prospect that the list of active ovens will be reduced considerably in the next two weeks. Foundry coke is quoted in the new circular at $1.50.

The Movement of the Mills to the Cotton.

We do not wish to check to rudely the exuberance of our Southern friends, but would offer the opinion that their expectations of the closing up of New England cotton mills and the transfer of the manufacturing South, isn't liable to come in our day and generation. When a new cotton mill is built hereafter, it is as likely to be in the South as anywhere, that is all.—[Boston Commercial Bulletin.

PIG iron warrant stocks, April 10, 122,200 tons.

THE ELECTRIC MOTOR IN MACHINE SHOPS.

In discussing the use of electric motors in *Dixie*, J. H. Al'en points out that if a new shop is being planned, a first advantage on the side of the electric motor is in the construction of the roof. "Where shafting is to be carried, provision must be made for supporting the bearings at frequent and regular intervals; the light is shut out from above, and unless windows can be placed along both sides of the building there are apt to be dark corners where dirt and litter will congregate, where the artificial lights must be kindled early of a winter afternoon, and where eventually the low grade work of the shop will be done. This is not relieved in a many-storied building, even though an electric motor is used on each tool, but where all tools are upon the ground floor there is a very considerable saving in first cost of building construction which will go far towards the internal equipment."

As to the relative cost of maintenance the writer makes no estimate but calls it even, with the reservation that this is perhaps unfair to the motor. In enumerating the things saved with the motor he questions whether the average user of power knows if 10, 20, 50 or 80 per cent of the power carried from the engine by the main belt is lost by long lines of shafting, with bearings out of true, and with innumerable countershafts brought down too hard in their boxes because of tight vertical belts.

While he believes motors developing one-third or one-half a horse power are not economical, he advocates the use of motors of moderate power driving a group of machines that can be kept running together and work the motor up to maximum efficiency. The saving by the motor, when no work is being done, is a prime point. "Machinery stands idle from five to 95 per cent of the time. For machine shops in ordinary practice, the estimate varies from 30 to 50 per cent, and it is very frequently the case that the heaviest machines are farthest from the engine, because they have been put in as the business has grown up to require them and are set where there is room for them. This means that the shafting is turning many hours for every hour of service and the power going to waste, whereas with the electric motor when the machine stops the current is cut out and everything is at rest and non-consuming. Such an application of power is especially valuable for a boiler shop, where the tools are heavy, each requiring considerable power and each lying idle, in the run of practice, for the greater portion of the time.

"For small places where 10 or 12 horse power suffices, it would probably be foolishness to put in a special plant; but it would be the height of wisdom to throw away the engine and boiler, substitute a motor therefor and buy power from a lighting or railroad company. This cuts off the wages of the engineer, the coal, water and extra insurance at a blow and relieves the owner of all care.

"To sum up the results attained up to the present time, it may be stated that the electric motor can be profitably substituted for shafting in driving machinery requiring an aggregate of three or more horse power to operate it, whether this machinery be in a single piece or a group; that it is especially valuable for driving isolated tools that stand at a distance from the source of power; that it is well to use it as a prime motor in small shops and factories; that in new buildings it will effect a saving in the first cost of roof and truss construction; that it is remarkably well suited for intermittent work like that of cranes and hoists; that the best voltage to be used is in the neighborhood of 220; that the electric motor should not be used for small powers, and is not suitable for small shops where power must be generated on the premises, and where all tools can be grouped about the prime motor in such a way that the dead load of shafting running idle can be thrown off."

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The *Mechanical World*, in considering the electric motor, presumes that the plan is the separate driving of each machine of which the electric motor forms part and parcel. It looks upon the electric driving of separate lines of shafting as of doubtful value and scarcely worth considering:

"It has been said that in the majority of engineering works the cost of the motive power represents a very small proportion—perhaps one or two per cent—of the total amount expended in wages, rent, interest and depreciation, charges, etc., so that there is not much scope for effecting a very appreciable saving. At the same time, it is desirable to take into careful consideration the incidental advantages of electric driving, for these may, quite conceivably, be of far greater importance in some situations than any actual increase in the efficiency of transmission. Thus, in some shops, the removal of all overhead obstructions such as pulleys, belts, main and counter-shafting with its necessary supports, appendages, etc., would be of the greatest possible advantage if only by reason of the increased facility afforded for the use of overhead travelling cranes. The further incidental advantages of quietness and increased light may not be of very great moment, but are nevertheless points worthy of mention. Another consideration of importance in machine shops, is the saving in power effected when any of the machines are at a standstill owing to want of work or other cause. In times of slackness it is not at all unusual to find the whole of the shafting in a shop running in order to drive, perhaps, one or two tools, the power thus being wasted representing several times that usefully employed. Similarly, in such cases as require one or two tools to run overtime, we have a dead loss of power out of all proportion to that actually utilized. But electric driving enables us to cut off all useless waste of power and to drive any individual tool with facility and economy."

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The wastefulness of the steam engine is the phase of the subject that is made prominent by the London *Engineering Review* in this paragraph:

"Among the many changes which the development of electrical power is bringing to pass, not the least notable is the economy of power in our factories, workshops and mines. A fairly good engine will waste over 90 per cent of the energy of the steam that it receives, so that only the remainder will be converted into useful work. If, however, a good dynamo or motor is properly loaded, it should have an efficiency of about 80 per cent. Many attempts have been made to raise the efficiency of the steam engine, but few of these have been successful. Ericsson did indeed, with his air engine, reach 25 per cent. efficiency, or about two and a half times that of the best steam engine, but the air engine did not make much headway because of its cost, size and unreliability. In using an electric motor there are two transformations of energy, each involving a loss of 15 to 30 per cent of power, but by delivering more power to the dynamo than is needed by the motor to perform its work, this has been to a certain extent overcome."

THE following statement is sent us on behalf of the defendants in the case referred to: The U. S. Court of Appeals has reversed the decree and dissolved the injunction the United States Circuit Court gave Curtis & Curtis, of Bridgeport, Conn., against the Wells Machine Works, of Fostoria, O., for alleged infringement of pipe threading machine patents, and sustained all the claims of the defendant. W. C. & F. E. Wells have licensed the Brass & Iron Works Co., of Fostoria, O., to manufacture the machines, together with their line of special pipe mill machines, nipple and jobbing machines, automatic nipple machines, and bolt threading and nut tapping machines.

THE Shelby Steel Tube Co. is now employing 350 men at its works in Shelby, O. H. H. Cockley, secretary of the company, is now abroad looking up improved machinery for the manufacture of tubing. The company has recently disposed of its abandoned "lower works" to the town of Shelby, which in turn has located in the plant, Col. R. P. Gormully, of Chicago, who will equip it as a bicycle factory.

STOVE plate molders' wages for 1895 have been fixed at the same rates as those paid last year. This was agreed upon at a meeting held recently by the officers of the Stove Manufacturers Association and those of the Molders' International Union.

IN the settlement of the wage dispute at the Round Oak Stove Works, Dowagiac, Mich., it was agreed that the former schedule of wages be restored and that the non-union men be retained. The union men will be taken on as fast as vacancies occur.

MELTING GRAY IRON WITH NATURAL GAS.

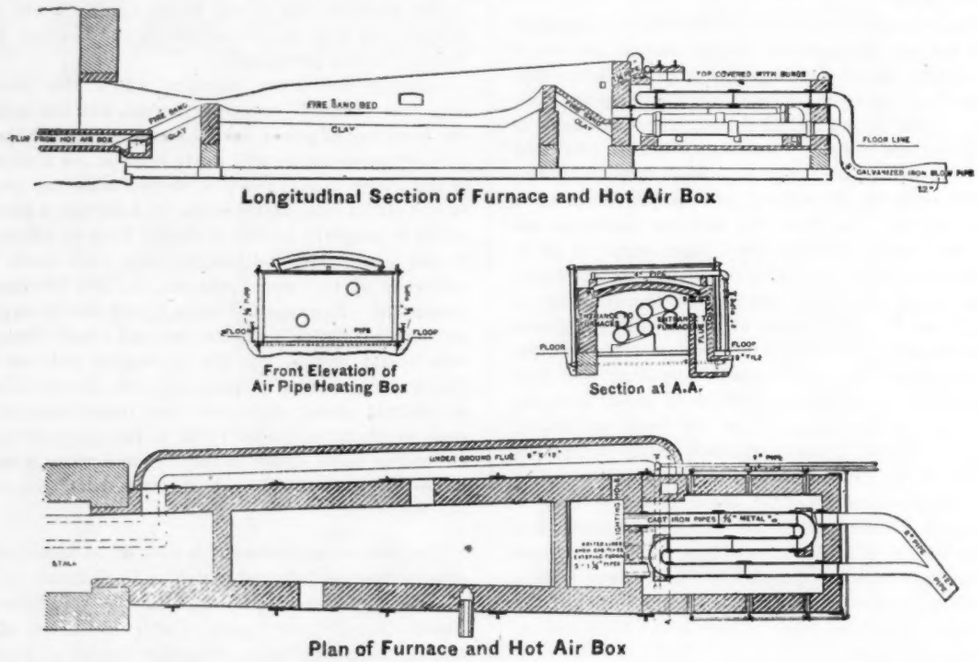
The Whiteley furnace for melting gray iron with natural gas, as used by the designers at the foundry of the Whiteley Malleable Castings Co., Muncie, Ind., was described briefly by *The Iron Trade Review* in connection with an account of the first public tests at Muncie. Further details are given in the following paper prepared by Burt H. Whiteley for the April meeting of the Foundrymen's Association. The features of its construction will become clearer on referring to the cuts which accompany the description:

The melting furnace, as we have it now, is composed of two parts—the melting furnace proper and the heating chamber. There is very little difference between the melting furnace such as we use and the regular malleable iron reverberatory furnace. The first experiments we made in the melting of gray iron with natural gas we introduced cold air directly into the furnace at the same point where the hot blast now enters. The trouble then was that the iron became oxidized, and when it was fluid enough to pour, the latter part of the heat became too hard. We were then introducing our gas through the same pipe under 50 pounds pressure and the air under about eight ounces pressure. This arrangement was also very hard on the furnace, especially as the combustion took place about 24 inches from the point at which the gas and air were introduced. We tried many different ways to overcome these troubles until finally we have the furnace in the present shape. We find that it is necessary to heat the air or blast quite hot before it is introduced into the furnace, and by so doing we have been enabled to decrease the blast pressure from eight to three ounces, and have decreased the gas pressure from 50 pounds to 12 ounces.

The heating chamber is made quite hot by three burners of natural gas, introduced on either side. The pipes through which the air passes into the heating chamber are made of hard iron and the joints are calked with asbestos packing. We tried both wrought iron and gray iron pipes, but they would not stand the heat. By this arrangement we have also very materially reduced the wear on the furnace. Under the old plan the bungs burned out in six or eight heats, and under the improved plan we think that they will last from four to six months. We are able to run about 20 heats out of the furnace before it becomes necessary to put in a new sand bottom, which can be done in a couple of hours. The furnace is charged, operated, skimmed, etc., just the same as any malleable iron furnace. We melt from two and one-half to seven tons at a heat, and if necessary can run four heats in 10 hours. By this process we are enabled to charge our furnace in 30 minutes after it is first fired. It takes us about two hours to melt the iron sufficiently hot to run very light castings. As soon as the iron is skimmed, tested and ready for pouring, all of the hot blast is shut off, and we merely keep enough gas turned on to retain the heat. While it may seem that the gas or extra heat would have a tendency to make the iron hard, such is not the case, as it is impossible to tell from test bars the first from the last of the cast. We have held the charge in our furnace for over an hour after it was ready to pour, in order to see what we could do with it, and there was no perceptible change in the iron as to hardness or closeness of grain.

In order to demonstrate the strength of the iron we have to-day made some tests, the bars being 1 inch square, 24 inches between centers. One of them stood a breaking strain of 1,615 pounds and the other 1,625 pounds. The iron is very soft and tough. The mixture was made up of 35 per cent No. 2 Sewanee iron, 35 per cent No. 2 Sharon iron, five per cent of 12 per cent silicon iron, and 25 per cent of machinery scrap. We did not buy this iron with the expectation of using natural gas, in the future we expect to discontinue the high silicon iron, using one-half No. 1 pig iron, and from 30 to 40 per cent of machinery scrap. The process thus far is very satisfactory, and we can make any kind of castings from heavy rolling mill work to the very lightest of gray iron castings.

I have not touched upon anything in the above as to the expense of this process. It is generally understood here that about 22,000 feet of gas will equal one ton of coal, so that the parties interested will have to make their own calculation as to its economy. With us the expense of the fuel is only the drilling of the well and laying the pipes.


Longitudinal Section of Furnace and Hot Air Box
Front Elevation of Air Pipe Heating Box
Section at A.A.
Plan of Furnace and Hot Air Box

WHITELEY FURNACE FOR MELTING GRAY IRON WITH NATURAL GAS.

SOME difficulty has been had at the new plate mill of the Illinois Steel Co., at South Chicago, because of the inability of the heating furnaces to serve the rolls fast enough, and with hot enough ingots. Consequently, the company has made arrangements to put in two more heating furnaces, which will increase the output of the plant materially. It is reported, also, that the Illinois Steel Co. will build two more open-hearth furnaces, at its South Chicago plant, in the near future.

THE Brown-Bonnell Iron Co., of Youngstown, O., has been at work recently on orders for some of the heaviest angles and plates ever turned out at its plant. Angle iron for Detroit bridge work is now being shipped, that is 6x6 inches ⅞-inch thick and 70 feet long, the weight being about 2,600 pounds. Plate iron is being rolled, also for Detroit, 71 feet six inches long and weighing 2,600 to 3,000 pounds—the largest bridge sections ever rolled at Youngstown.

GERMAN pig iron production in January and February was 924,279 tons; for same months in '94, 829,792 tons.

LARGE PUMPING ENGINES

The question of precedence in the size of pumping engines has been discussed somewhat of late, comparisons being made between pumps manufactured by the Edward P. Allis Co., the Holly Mfg. Co. and the Snow Steam Pump Works. In our last issue attention was called to the statement of Mr. Reynolds, of the Edward P. Allis Co., concerning the Chapin mine pump. Below we give a communication by J. F. Holloway, the well-known New York engineer, which appeared in the last issue of the *Engineer:*

In an engineering journal there recently appeared an article giving a brief description of a pumping engine which the Indianapolis Water Co. had contracted for with the Snow Steam Pump Works, of Buffalo, and which it was said would "without doubt be the largest pumping engine in water works service in the United States, volume and pressure considered."

To this reply was made in the same journal by C. G. Hildreth, secretary of the Holly Mfg. Co., in which he said: "As there are in operation a number of pumping engines of larger dimensions and greater power than the engine referred to (the Indianapolis engine,) we think that you would wish to have the statement corrected, and we therefore inclose herewith a list of the larger engines built by the Holly Mfg. Co." Following this was a list of pumping engines built by his company, intended, doubtless, to include engines of "larger dimensions and greater power" than the Indianapolis engine. In a subsequent number of the same paper there appeared an article signed Irving H. Reynolds, in which he refers to the statement made by Mr. Hildreth and adds, that "so far as we are aware, we (the Edward P. Allis Co.) have built the largest pumping engines yet produced in America, as will be seen by the inclosed table." That the situation be made quite clear, the list as made by both parties is reproduced as follows, and in

HOLLY MANUFACTURING CO.

Place.	Type of engine.	Number of steam cylinders.	Diameter of steam cylinders.	Number of pumps.	Diameter of plungers.	Stroke of engine and pump.	Capacity, million gallons.	Water pressure in feet.	Horse power.
Philadelphia	Hor. comp.	4	33 & 66	2	36	48	20	172	603
Buffalo.....	Hor. comp.	4	36 & 72	2	36	48	20	184	646
Buffalo.....	Hor. comp.	4	36 & 72	2	36	48	20	184	646
Buffalo	Hor. comp	4	36 & 72	2	36	48	20	184	646
Philadelphia	Ver. tri. exp.	3	36 & 62½ & 92	3	30	60	30	145	764
Philadelphia	Ver. tri. exp.	3	36 & 62½ & 92	3	30	60	30	1 5	764
Pittsburg. ...	Ver. comp.	2	41 & 82	2	21	56	10	462	823
Pittsburg.....	Ver. comp.	2	41 & 82	2	21	56	10	460	823

EDWARD P. ALLIS CO.

Pittsburg	Ver. comp.	2	50 & 92	2	22½ & 31¼	64	12	420	887
Omaha.....	Ver. trip e.	3	40 & 70 & 104	3	32	60	18	310	982
St. Louis.....	Ver. triple.	3	30 & 54 & 80	3	25½	64	10	289	508

SNOW STEAM PUMP WORKS.

Indianapolis	Ver. tri ex.	3	29 & 52 & 80	3	33	60	20	349	1228

order to make the comparison fair, the horse power of all the engines are figured on the same basis. Mr. Hildreth says: "It is customary in calculating the power of pumping engines, to consider the normal or regular working pressure for which they are designed, the power required to raise the necessary fire pressure being incidental is not an important factor, as fire pressure is usually obtained by extending the point of cut-off and admitting more steam into the cylinders without regard to economic duty." Mr. Reynold's says: "To rate a pumping engine either by its capacity or its horse power is misleading, for the reason that the speed of pumping engines varies greatly, and many of the larger machines are operated at such slow speeds that they develop less horse power than smaller engines at higher speeds, and the quantity of water delivered is no index of size, for the reason that the head pumped against may be great or small."

With such differences among builders of this class of machinery, as to the proper method of computing their size and power, would it not seem proper to adopt the plain, practical and fair mode of rating a pumping engine by what it was built to do, and by what in reality it is doing. It is not at all probable that either of the establishments who presented lists of their largest engines furnished any of the cities named, pumping engines which were largely in excess of the requirements of each location; indeed it sometimes happens that such engines are more or less deficient in strength and power, than otherwise. Omitting the engine built by the Allis Co. for the Chapin mine as not being a water works engine, there are no engines on the list furnished by Mr. Hildreth and Mr. Reynolds but what are pumping into reservoirs, or into pipes in which the pressure is controlled by a reservoir connection; under such conditions the capacity, head, and horse power of each engine is constant and fixed, and the engine cannot be called upon to pump under any higher pressure than that due to the height of the reservoir, and of course no extra strength or power is required in such engines. Under the conditions that prevail at Indianapolis, where the water is delivered direct into the mains without a stand pipe or reservoir, it requires that an engine must have the strength and power to pump under its maximum load so long as the necessities for so doing exist.

It is fair to presume that each engine named in the above list was designed and built for the particular service named, and if each engine does the work for which it was intended, then the work done becomes the measure of its size and capacity, the matter of steam pressure, cut-off, or economy not being questions under consideration.

Mr. Hildreth says that "the raising of pressure for fire service being incidental, is not an important factor." The requirement that a large pumping engine shall within one or two minutes increase its work from pumping against 80 lbs. per square inch to 150 lbs. may be incidental, but it can by no means be considered an unimportant 'factor' either to the engine builder or the company, or city that own and operate it. An engine that is thus to be called upon to almost instantly nearly double its power and work, must be an engine designed and constructed for such work, and if it does it, then the work done becomes the measure of the size and power of that engine, and on such a basis it will be seen that the Indianapolis engine, so far, stands at the head of the list, 'volume and pressure considered."

N. & G. TAYLOR CO., tin plate manufacturers, Philadelphia, say that the demand for the Taylor "old style" brand of roofing tin has been such that they have been compelled to erect two additional stacks at their works. This makes a total of 22 tinning stacks, and will give them an output of over 7,000 boxes of 14x20 weekly by day work. In the same connection they write, on the question of quality: "All changes that have been made in the manufacture of tin plate since 1830, without a single exception, have been in the interest of the makers and not in the wearing quality of the plates. The first step, which was the use of rolls, was for the purpose of squeezing off the metal. And then the use of rolls in the oil pot was for the same purpose, the oil being kept at such a high temperature as to keep the metal in a liquid state and the rolls to squeeze it off. In late years acid flux has been a great friend to the manufacturer, but the greatest possible enemy to the consumer and the tin plate trade. We expect to erect an addition to our works during this season for the production of continuous roofing. Our continuous roofing is made without the use of acid flux, which is sure to eat through and result in a worthless roof. We also contemplate the production of large tinned sheets.

THE Totten & Hogg Iron & Steel Foundry Co., of Pittsburg, manufacturers of rolling mill and tin mill machinery and engines, are still running their shops night and day. They have lately shipped eight mills to the Montpelier Sheet & Tin Plate Co., of Montpelier, Ind.; eight mills to the National Tin Plate Co., of Anderson, Ind.; two mills to the Baltimore Iron, Steel & Tin Plate Co., of Baltimore, Md.; and are now ready to commence shipping the machinery for the Laughlin Nail Co.'s plant at Martin's Ferry, O. They have already sent forward the buildings, which are being erected as fast as possible. The Totten & Hogg Co. are building the entire plant for the Laughlin Co., which will be one of the largest and finest plants in the country. It will eventually consist of ten hot mills and seven cold rolling mills.

MILLING, PLANING and DRILLING MACHINE VISE

The accompanying cuts represent a vise for use on a planer, shaper, milling machine or drill press, put on the market by the Massey Vise Co., 35-37 South Canal St., Chicago. The part A in Fig. 1 is a loose jaw, and part B a grip plate. The jaw A is free to slide backward and forward on the longitudinal slot in the vise, as is also the grip plate when tilted slightly forward, thereby disengaging the two teeth from those on the body of the vise. Fig. 2 represents a section of

FIG. 1.—MILLING, PLANING AND DRILLING MACHINE VISE.

a part of the vise, showing that the rear faces of the steel jaw plates C C are inclined, thus causing them, it is explained, when an article is gripped in the vise, to slide downward for a short distance carrying with them the article held, the pin-holes in the jaw being slotted to allow this motion. It is pointed out that the jaw plates are raised again when the article held is released, by springs working in the recesses D D, as shown at the bottom of each plate. The small cap

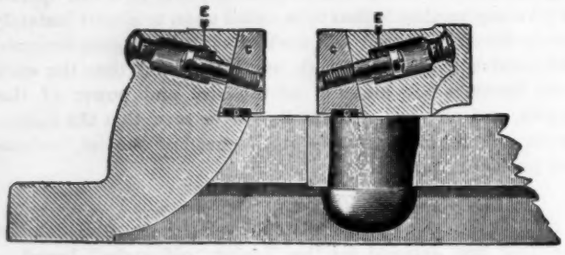


FIG. 2.—SECTIONAL VIEW OF PART OF THE VISE.

screws are designed to prevent water and dirt entering the pin-holes.

In Fig. 3 the appearance of the parts is shown when in position to hold a piece of taper work. In operation the work is placed between the jaws, the loose jaw and grip plate are slid up to it, and the screw in the grip plate is tightened against the loose jaw. The manufacturers say that the work will then be tightly held, and that at the same time it will be pressed down firmly and uniformly upon the surface of the

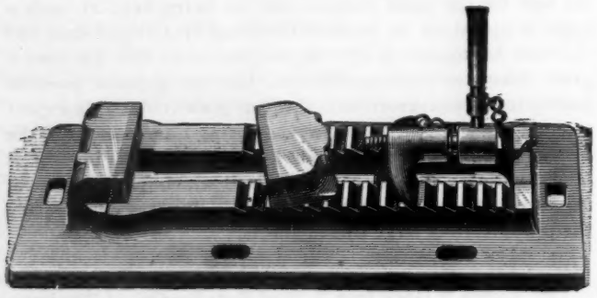


FIG. 3.—POSITION OF PARTS WHEN HOLDING TAPER WORK.

vise, obviating the necessity of hammering the work down. The makers claim that the vise embodies three features—quick and firm chucking, swivel jaw and the pressing of the work down on the bed plate by the inclined shape of the jaws. The vise is made in three sizes, three-inch, four-inch and five-inch face to open 6¼, 8¾ and 10¾ inches; and can be used on a milling or planing machine and drill press. Besides chucking regular work it saves the cost of making many special pigs.

CHARLES M. JARVIS was appointed receiver of the Mather Electric Co., of Manchester, N. H., April 6.

CONDITION OF BLAST FURNACES OF U. S.*

April 1, 1895.

Location of Furnaces.	Charcoal. Total No. of Stacks.	Charcoal. In Blast. Number.	Charcoal. In Blast. Weekly capacity.	Charcoal. Out of Blast. Number.	Charcoal. Out of Blast. Weekly capacity.	Bituminous or Coke. Total No. of Stacks.	Bituminous or Coke. In Blast. Number.	Bituminous or Coke. In Blast. Weekly capacity.	Bituminous or Coke. Out of Blast. Number.	Bituminous or Coke. Out of Blast. Weekly capacity.
New England	11	2	189	9	829	..	..	.....	...	.....
New York	6	1	65	5	635	5	2	2718	3	3335
Pennsylvania	13	3	147	10	760	5	1	962	4	2760
Pittsburgh	.....	.....	.....	.....	.....	24	20	35839	4	6377
Spiegel	.....	.....	.....	.....	.....	2	1	900	1	885
Shenango Valley	.....	.....	.....	.....	.....	16	15	16759	1	600
Jun. and Con. Vals	.....	.....	.....	.....	.....	17	7	7468	10	4800
Maryland	4	0	0	4	310	5	.....	.....	5	5955
Virginia	4	0	0	4	210	23	9	5400	14	7855
North Carolina	.....	.....	.....	.....	.....	2	.....	.....	2	745
West Virginia	.....	.....	.....	.....	.....	4	2	2390	2	1095
Ohio—Mahoning Val	.....	.....	.....	.....	.....	12	7	8772	5	6320
East, Cent. & North	.....	.....	.....	.....	.....	16	11	12810	5	4900
Hocking Valley	.....	.....	.....	.....	.....	6	1	207	5	2250
Hanging Rock	10	1	68	9	777	11	8	2283	3	605
Kentucky	3	0	0	3	865	6	2	629	4	1770
Tennessee	8	2	513	6	1565	13	6	4675	7	4260
Georgia	3	1	243	2	375	2	.....	.....	2	1200
Alabama	13	1	65	12	3015	38	15	12833	23	14455
Indiana	.....	.....	.....	.....	.....	2	.....	.....	2	275
Illinois	.....	.....	.....	.....	.....	19	9	13683	10	13650
Michigan	20	4	1432	16	4913	.....	.....	.....	.....	.....
Wisconsin	5	1	830	4	1120	4	2	1702	2	1540
Minnesota	.....	.....	.....	.....	.....	1	.....	.....	1	665
Missouri	2	0	0	2	580	3	.....	.....	3	2280
Texas	4	1	127	3	845	.....	.....	.....	.....	.....
Oregon	1	0	0	1	280	.....	.....	.....	.....	.....
Colorado	.....	.....	.....	.....	.....	3	1	840	2	1598
Total char. and coke	107	17	3679	90	17079	239	119	130870	120	90345
Total anthracite (New York, New Jersey, and Lehigh, Schuylkill, Upper and Lower Susquehanna and Lebanon valleys.)	130	33	19352	97	40755	.....	.....	.....	.....	.....

SUMMARY.

Fuel.	In Blast. Number.			In Blast. Weekly Capacity.			Out of Blast. Number.		Out of Blast. Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	17	15	18	3,679	3,579	4,038	90	92	17,079	17,364
Anthracite	33	34	33	19,952	19,549	18,234	97	96	40,755	40,165
Coke	119	121	93	130,870	130,601	110,111	120	118	90,345	87,886
Total	169	170	144	154,501	153,789	132,383	307	306	148,179	145,415

*The above table is condensed from the *American Manufacturer*. The tables of the *Iron Age* show in blast April 1, 19 charcoal furnaces, with 4,040 tons weekly capacity, instead of 3,679; 34 anthracite, with 20,242 tons weekly capacity, instead of 19,952; and 118 coke, with 133,850 tons weekly capacity, instead of 130,870. Total, 171 active furnaces, with a total capacity of 158,132 tons, instead of 154,501, as above.

Compressed Air in Railroad Shops.

The use of compressed air for various purposes is being rapidly extended in the shops of the Mexican Central, in the City of Mexico. The compressor supplying the air, was manufactured in the shops, and consists of three Westinghouse driver brake cylinders, placed vertically beneath a horizontal shaft, the pistons being driven by three eccentrics with a nine inch throw. These eccentrics and straps are their standard locomotive castings. This compressor supplies air to the boiler shop where there is in use a complete set of the Beard pneumatic tools for punching and riveting. There are also rotary machines for drilling, tapping and screwing in stay bolts, one staybolt breaking machine for breaking out old staybolts, and another machine for cutting off the ends of new staybolts. Compressed air is also used in the shops for drilling, and will be used for working cranes at the different heavy machines, for jacking up engines and cars and for running special tools in the roundhouse and airbrake department.

MESSRS. HIMROD, GOODRICH & CO., dealers in pig iron, coke and coal at 617 the Rookery, Chicago, have just sent out a very tasteful lot of calendars for the current year, consisting of colored reproductions of some of Walter Crane's water colors of scenes at the World's Fair.

THE PROBLEM OF CHEAP CAR WHEELS.

The temptation to cheapen their product has borne strongly upon car wheel manufacturers in the past two years. Some of them have met the requirements of a falling market by studying the chemistry of their foundry work, and have been able to follow the market without sacrificing the capacity of their wheels for service. In other cases a very different policy has been pursued, much to the annoyance of buyers and in many instances to the discomfiture of makers. An Ohio wheel manufacturer, in a communication to the *Street Railway Journal* tells of the embarrassment under which wheel founders have labored, who have maintained their old mixture and have had only the benefit of the falling price of iron and old wheels, in meeting the unprecedented competition in that market:

"The trouble commenced about two years ago, when a well known wheel manufacturer went into the market to sell wheels regardless of cost, and made some flattering promises as to guarantee of mileage and extremely easy payments, and he captured a great amount of wheel business. At that time, street railway companies were having but very little trouble with their wheels. Prices were then reasonable, and wheel makers could afford to use good stock and make wheels that would give very satisfactory results. It is safe to say that it was not more than a few months before 85 per cent of the companies who were furnished with wheels by the concern referred to were having trouble with flat and broken wheels. We were at a loss to know how any American wheel maker could furnish wheels at such extremely low prices and guarantee the mileage, and give such easy terms in regard to payments and retain the good quality of the wheels, but after several months the problem was easily solved, from the fact that the wheels furnished by the concern referred to, were of such poor quality of iron that they even made a living profit at the extremely low price.

"Many street railway companies demanded new wheels to replace the bad ones they had received, and no doubt figured that they were reimbursed for what they had already purchased, but in my judgment, a railroad company cannot be reimbursed for wheels that are worthless, by the wheel makers furnishing other whee's. The expense of changing the wheels is more than that of the cost of the same. Other concerns, later on, were determined to capture some of the wheel business, and they followed nearly on a par with the firm above referred to and they also fell down.

"There is a limit to the price at which wheels can be sold if the standard of the material used is of the highest grade, and when the street railroad companies are tired of buying cheap wheels, and will place their orders with the old, reliable companies that have made wheels for the last 25 or 30 years, then the trouble they are having with this part of their rolling stock will in a great measure cease. My company has made wheels for the last two years at a loss, simply because we would not manufacture a wheel from a cheap grade of iron and, rather than lose our high reputation as wheel makers, we were content in furnishing wheels in small quantities to companies that felt disposed to pay a higher price for a first-class wheel, than to buy cheap wheels that were a great source of annoyance to them."

Personal.

Wilson M. Day, formerly editor of *The Iron Trade Review*, has been deservedly honored by election to the presidency of the Cleveland Chamber of Commerce. Mr. Day's labors for the advancement of Cleveland industrially and commercially have been in season and out of season and the Chamber of Commerce in this latest recognition of them has well served itself.

Edmund C. Pechin's address for the present is Buchanan, Botetourt Co., Va.

President, Jos. D. Weeks, Pittsburg; vice-presidents, W. B. Kundhardt, New York; J. T. Lewis, Chicago, and C. A. Stetferdt; secretary, Dr. R. W. Raymond, New York; treasurer, Thos. D. Rand, Philadelphia, are the new officers of the American Institute of Mining Engineers elected at the St. Augustine, Fla., meeting last week. The board of managers selected includes Messrs. L. Holbrook, New York; W. R. Webster, Philadelphia, and A. R. Leedom, of New York.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The W. H. Blake Steam Pump Co. has been organized at Fitchburg, Mass., with a capital stock of $20,000.

F. F. Drinkhouse and James Leadhill have formed a copartnership as machinists and founders, at Easton, Pa.

George O. Tenney, Chattanooga, Tenn., wants to purchase a second-hand double-drum hoisting engine, with or without boiler.

The Conshohocken Galvanizing Co., of Conshohocken, Pa., capital $50,000, has been incorporated by Jas. E. Salter, J. Lukens, Jesse L. Heywood, A. L. Murphy, Henry M. Tracy and Lewis N. Lukens.

The Troy, N. Y., Steel Metal Co. has been incorporated. The capital stock is $10,000, and the directors are: Jessie D. Ennis and Robert J. Wylie, of Troy, and Frank H. Knox, of Lansingburg, N. Y.

The Girard Stove & Foundry Co., Youngstown, O., are in the market for a second-hand roll lathe 30-inch swing, 12-foot bed, and a belt or steam power traveling crane, 25 tons capacity and 50-foot span.

The Commissioner of Public Works of Brooklyn, N. Y., will receive bids until May 9, for furnishing and erecting pumping engines of an aggregate minimum capacity of 60 million gallons per day.

The Havana Bridge Works have been incorporated at Montour Falls, N. Y., with a capital stock of $10,000, and have purchased the foundry and machine shop formerly operated by Jas. A. Shepard & Son.

A. B. C. 378, *Sun* office, Baltimore, Md., asks bids on one hollow-spindle 32-inch-swing lathe, one hollow-spindle 12-inch-swing lathe, one Universal milling machine, one 30-inch-swing drill press; second-hand tools preferred.

Martin & McKown, Wheeling, W. Va., will be in the market for squaring shears, folding machine, burring machines, mandrel, soldering cappers, solder, rivets, wire rolls for forming, etc., to be used in manufacturing oil cans.

Putnam, Hooker & Co., Cincinnati, O., will receive bids for 350 h. p. boilers and 65 h. p. engines for the new plant, which the concern will erect in Covington. Ground has been broken and the plant will be rapidly pushed to completion.

The Dow Wire Works Co., Louisville, Ky., will buy a punch with throat 18 to 24 inches, heavy enough to punch a ⅜-inch hole through ½-inch iron; also a second-hand break, six feet two inches between housings, for breaking sheet iron Nos. 10 and 12.

Empire State Electric Forging Co., of Syracuse, N. Y., has been incorporated to manufacture electric welding, forging and smelting apparatus; capital, $300,000, and directors, L. H. Groesbeck, C. M. Warner, J. O. Adsit, D. E. Mosely and E. D. Woodruff.

New Construction:—

The Carton Furnace Co., Utica, N. Y., has just completed its new foundry.

A foundry for casting steel bells is to be established at Northville, Mich.

The Pennsylvania Railroad is to erect a new roundhouse and a car and machine shop at Blairsville, Pa.

William Wharton, Jr., & Co., will erect a new foundry and machine shop at 23d st. and Washington ave., Philadelphia.

James P. Wetherill is interested in a new machine shop to be built at Chester, Pa., for the manufacture of special machinery and general work.

The R. S. Newbold & Sons Co., has purchased the Eagle Iron Works, Norristown, Pa. A new machine shop will be built and a Sellers' 18-ton travelling crane is to be put in.

Jones & Laughlins, Ltd., of Pittsburg, will erect two large buildings, both of steel, one 64x180 feet, the other 60x150 feet. The manufacture of sheet bars by a continuous process will be undertaken.

The shops of the Southern Railway, at Knoxville, Tenn., will include a machine shop, 100x322 ft.; smith shop, 90x322 ft.; erecting shop, 90x342 ft.; paint shop, 90x322 ft.; store house, 50x142 ft.; sand house, 20x70 ft.; paint storage house 40x65 ft., and oil and waste house, 20x30 ft. The shops will employ

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Successors to D. Fraser Mfg. Co. and Eagle Pattern Wks.
MILWAUKEE, WIS.

LIGHTNING LIFTING SCREWS. TAPER THREAD.

about 1,000 men, and will have a capacity to keep in repair 8,000 freight cars, 300 passenger train cars and 150 locomotives.

L. M. Morris, of Pittsburg, Pa., proprietor of the Iron City Foundry, burned several weeks ago, will rebuild on the old site provided railway facilities are granted. An iron building of larger size will be erected.

A United States syndicate is reported to be considering the establishment of blast furnaces and iron works at Ballard, a suburb of Seattle, Washington. As a source of supply for suitable ores, it has investigated the iron deposits of British Columbia and bonded two properties—the Redonda mines on Redonda Island on the coast, and the Glen mine, situated a few miles from Kamloops. Both deposits are magnetic iron, the former giving 61 per cent, and the latter 65 per cent of iron. It is said that the syndicate intends to spend something like $2,000,000 on its plant, which, among other things, will include works for the construction of railway freight cars, with capacity of 25 cars per day. It is expected to produce 125 tons of iron a day.

H. G. Hamilton and others, of Youngstown, O., have completed arrangements for the erection of a steel plant, blast furnace and rolling mill at Kingston, Ont., and received a message that the Kingston Council had accepted their proposition. They are to be given a bonus of a tract of land and a loan amounting to $250,000 from the city of Kingston, the iron and steel company to pay this back by turning over the bounty paid by the Dominion Government on pig iron and steel billets. It is estimated that this will be nearly $100,000 a year. It is estimated that the steel plant, furnaces, etc., will cost $600,000. The output guaranteed is 140 tons of pig iron a day, 40 tons of steel billets, and 40 tons of bars. The new company is to be exempt from taxation for ten years and to be furnished water free.

Additions, Enlargements, Removals, Etc.:—

An addition will be built to the works of the Massey-Harris Co., at Toronto, Ont., the coming season. It will be 90x60 feet and four stories.

A 48-foot addition will be made to the machine shop of the Frankford Steel Forge Co., Ellwood City, Pa. The present building is 50x148 feet.

The Ellwood Shafting & Tube Works, Ellwood City, Pa., will add two or three new buildings shortly and instal a new engine and other machinery.

The Robinson Mfg. Co., Oxford, Me., expects to build a three-story 80x54-feet addition to its plant and will put in a plant of 75 to 100 h. p. to operate it.

The David Bradley Mfg. Co., now located in Chicago, and one of the largest concerns engaged in the manufacture of agricultural implements in the west, has purchased 36 acres of land and several buildings at Kankakee, Ill., and will at once begin the erection of works at that place. The company will construct a foundry 80x300 feet, a blacksmith shop of the same dimensions, stock-room, paint-shop and offices.

Fires and Accidents:—

The works of the Southern Foundry Co., South Norfolk, Va., have been burned.

A fire destroyed part of the works of the Marston Foundry & Machine Works, Dover, N. H.

At Oakland, Me., the plant of the Waterman Tool Co. and the Oakland Machine Co. burned. Loss $20,000.

The building at Akron, O., formerly occupied by the Akron Steam Forge burned April 12, with $10,000 loss.

The plant of the Susquehanna Iron Co., at Columbia, Pa., was partly destroyed by fire April 10. Loss $100,000, insured.

At the Warren Foundry & Machine Co.'s pipe works, Phillipsburg, N. J., the breaking of the chain supporting a ladle threw a molder into a pit and molten iron ran over him, burning him to death.

General Industrial Notes:—

Work has begun on the blast furnaces at Hot Springs, Utah.

The Tyrone Iron Co., of Tyrone, Pa., has reduced wages 10 per cent.

Mattie Furnace, at Girard, O., made an output of 225 tons of Bessemer iron April 12.

It is reported that the Andover Iron Co., of Phillipsburgh, Pa., will soon blow in a furnace.

The burned pattern shop of the Union Foundry & Machine Co., at Catasaqua, Pa., is being removed.

Several departments of the Pennsylvania Bolt & Nut Works, Lebanon, Pa., have suspended operations.

Six women have been set at work in the tin plate plant of the Monongahela Co., at Pittsburg, separating the sheets.

At the 10-inch mill of the Homestead Steel Works, furnaces and new rolls have been added greatly increasing the capacity.

The Akron Steam Forge at Elwood, Ind., is working 150 men and expects to increase its force somewhat after May 1.

The Anderson (Ind.) Foundry & Machine Co., now making a specialty of tin plate machinery, put on a night force last week.

The Union Iron & Steel Co., Youngstown, O., shipped 25 cars of cotton ties last week to New York for the Southern trade.

Furnace C of the Edgar Thomson blast furnace plant at Braddock, has blown in after being out of blast for three months.

The West Superior Iron & Steel Co.'s foundry will be started up May 1, on a contract to make culvert pipe for railroads.

The 18-inch train, at the Rensselaer mill, of the Albany Iron Works, Troy, N. Y., has resumed at a 10 per cent reduction in wages.

R. D. Wood & Co.'s upper foundry, at Millville, N. J., which has been idle three months, has resumed work. The lower foundry started up a few weeks ago.

The Scottdale (Pa.) Iron & Steel Co., Ltd., has six hot mills and its muck and bar mills running full. The new cold mill being constructed will be ready about April 15.

The tenth mill has been completed at the American Tin

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

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Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

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Rolling Mills, Steel Works, Blast Furnaces, Cupola Linings, Boiler Settings.

— All Shapes in Stock —

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Ground or Calcined Clay in Sacks or Bulk.

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WESTERN AGENTS OF

Mount Savage and Queen's Run Fire Brick,

The leading BRICK of this country.

MANUFACTURERS OF

OHIO FIRE BRICK. ALL SHAPES IN STOCK.

The largest shippers of FIRE BRICK in the West.

Warehouse and Docks: 193-195 Merwin Street, CLEVELAND, OHIO.

Plate Works, Elwood, Ind., and the new sorting room is almost completed. The works now employ 750 men.

The Bellaire Nail Co.'s employes held a meetiug with the Amalgamated officers to consider the proposition of the company to reduce wages 20 per cent. They oppose the reduction.

The Whiting Foundry Equipment Co. has removed its office from Temple Court Bldg. to room 1522 Monadnock Blk., Chicago, which is in the midst of a colony of iron and steel interests.

The mill of the Baltimore Iron, Steel & Tin Plate Co., at Locust Point, near Baltimore, which has been closed down since Oct. 6, has been started up after considerable enlargement and improvement.

The Antrim Iron Co., of Grand Rapids, Mich., has blown in one of their stacks at Mancelona, after a long idleness. Extensive improvements and changes have been made, practically rebuilding the stack.

The Pioneer Mining & Mfg. Co. has started one of its furnaces in the Birmingham district. It is reported that none of the furnaces there are piling iron and some have been reducing accumulated stocks.

Machinery molders of Cleveland have decided to ask their employers to advance the minimum day wage from $2.25 to $2 50, May 1. The Walker Mfg. Co. has posted a notice that old wages will be restored May 1.

The managers of the new tin plate plant at New Lisbon, O., presented an iron-clad agreement to the men at the starting of the works. About two-thirds of them being union men refused to sign. The mill will run non-union.

The National Furnace property at DePere, Wis., has been sold to A. G. Wells. It is reported that the purchase was on behalf of the Continental Match Co., of New York, which has been seeking a location in the West for a duplicate of its Passiac, N. J., plant.

The industries of Muncie, Ind., are said to be busier than for a long time. The Indiana Iron Works have made large shipments. At the Midland Steel Works a new train of rolls has been put in operation and every department is working three turns every 24 hours.

President Moxham, of the Johnson Co., Lorain, O., says of the report that the switch works are also to be removed from Johnstown: "I can see nothing that would tend to change our present determination and that is that the switch works are to remain permanently in Johnstown."

The Sharon, Pa., board of trade has declined to guarantee to the workmen 20 per cent of their wages to start the Kimberley mill, and meet the condition imposed by the owners that 20 per cent. of wages be retained. An effort is being made among citizens to raise a guarantee fund.

The Youngstown (O.) Bridge Co. has been awarded a contract to erect a 122-foot single span, steel girder, deck bridge, 100 feet wide with paved roadway 60 feet wide at Denver. The company's bid was $29,500. There were 11 bids beside.

The South Tacoma, Wash., rolling mill, which Youngstown, O., capitalists removed from Burlington, Ia., on a $25,000 bonus proposition from the South Tacoma Land Co., is ready to run but it is said the money is not available, the land company's expectations concerning the sale of land not having been realized.

R. Seeburger has bought the plant of the Kansas City Steel & Iron Co., at Argentine City, Kan., and will operate it as the Seeburger Steel Works. The plant consists of an 18-pot gas-fired crucible steel melting furnace, the product of which will be steel castings for all purposes. If business warrants it a train of rolls will be added.

At Lorain, the great blooming mill engine in the Johnson Co.'s plant started up Monday. It is believed all the plant will be running smoothly by the end of the month. The steel mill has been shut down since the first blow of two weeks ago, on account of the loss of a converter bottom. The shape mill engines have been tested and brought into satisfactory working condition.

The annual election of directors, for 1895, of the Tennessee Coal, Iron & Railroad Co., was held recently. The following compose the new board: John H. Inman, C. C. Baldwin, James T. Woodward, A. B. Boardman, James Swann, W. S. Gurnee, Jr., John G. Moore, J. Edward Simmons, and J. J. McComb, all of New York; N. Baxter and A. M. Shook, of Nashville; A. T. Smythe, M. E. Lopez and J. E. Adger, of Charleston; John C. Haskill, of Bristol, Tenn., and D. Roberts, Birmingham, Ala.

An attempt will be made to operate the Atlantic Iron Works of P. L. Kimberley, at Sharon, Pa., on the co-operative plan. At a meeting held recently, Mr. Kimberly made the proposition that 20 per cent. of the men's wages be retained until the company can operate the mill with profit. If the earnings are greater than the expenses, the 20 per cent will be turned over to the employes. The question will be laid before the Amalgamated Association by the men, but they have expressed the opinion that such an arrangement could hardly be made.

Hyde Bros. & Co., of Pittsburg, are erecting two of their water tube boilers for Geo. W. Johnson, of New Castle, Pa., and are also putting in two combined heat and direct-firing boilers for Spang, Chalfant & Co., of Pittsburg. Their boilers

are giving excellent satisfaction as is evidenced by the fact that the two 100 h. p. waste heat boilers which they installed in the plant of the Ætna-Standard Iron & Steel Co., Bridgeport, O., were found on a recent inspection to be practically as good as new and are accomplishing in all respects all that was claimed for them.

The Pittsburg *Times* finds from interviews with iron and steel manufacturers in the Pittsburg district that the volume of their business is 25 per cent better than a year ago. The Pittsburg Forge & Iron Co. has 500 men employed now against 300 a year ago. J. Painter & Sons Co., cotton ties, report a perceptible revival of trade. Howe, Brown & Co., have 25 per cent more men at work than in April 1894. The Chartiers Iron & Steel Co is now running six days a week as against four and five days last year. W. Dewees Wood Co., and Zug & Co., note a steady increase. H. W. Oliver, while expecting no boom, thought that better times were ahead.

J. E. Rhoads & Sons, Wilmington, Del., manufacturers of oak tanned leather belting and belt preservers report that trade has been improving within the past few weeks. They have received rather more orders and have had considerable inquiry. Among their orders is one for a 43½ in., extra heavy double driving belt for a large cotton mill. This belt is 136 feet long and will weigh about 1,000 pounds. They have had a large demand for their Rhoads' leather belt preserver and their sales on it, as well as on some of their other side issues have been unusually large in the past few months. Their new make of bell cord which they have branded Tannate is meeting with good success, owing to its strength and durability.

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Numerous Excursions at Reasonable Rates.

Whether the tourist's fancy directs him to the New England States or the Atlantic seaboard; to the South; or to the lake region of the North; or to the Rocky Mountains and the wonderland beyond the Mississippi, he will be given opportunity to indulge his tastes at a small cost for railroad fare this year. There will be low rates to Baltimore over the Pennsylvania Lines in May, account the American Medical Association; to Decatur, Ill., account the German Baptist (Dunkard) meeting, and to Pittsburg for the Presbyterian General Assembly. There will also be low rates over these lines to Meridian, Miss., account the General Assembly Cumberland Presbyterian Church the same month. In June, excursion tickets will be sold over the Pennsylvania Lines to Omaha account the National Jr. O. U. A. M.; to Chattanooga, Tenn., for the International Convention of Epworth League; to Cleveland, Ohio, account the National Republican League Meeting, and to Roanoke, Va., for the German Baptist meeting. Excursions for July include low rates over the Pennsylvania to Baltimore for the Baptist Y. P. Union Meeting; to Asbury Park for the L. A. W. Meeting, and to Boston for the Christian Endeavor Convention, and to Denver, Col., account the National Educational Association meeting. In August, excursion tickets will be on sale over the Pennsylvania Lines to Boston, account the Knights Templar Conclave. The sale of low rate tickets will not be restricted to members of the organizations mentioned, but the public generally may take advantage of them.

In addition to the above, there will be plenty of other cheap excursions over the Pennsylvania Lines to various points. As the season is some weeks away, arrangements in detail have not been consummated, but it is certain that no railway will offer better inducements than the liberal concessions in rates and privileges that may be enjoyed by travelers over the Pennsylvania Lines. This fact may readily be ascertained upon application to any passenger or ticket agent of these lines, or by addressing F. Van Duzen, Chief Assistant General Passenger Agent, Pittsburg, Pa.

THE Nickel Plate Road can offer to the Sons of the American Revolution, reduced rates to their convention at Boston, Mass., May 1. Remember we operate through sleeping cars direct to Boston.

Home-Seekers Excursions South and Southeast via Pennsylvania Lines.

Special low rate excursion tickets with twenty day return limit will be sold March 5th, April 2d and 30th, from ticket stations on the Pennsylvania Lines to points in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia. For details, apply to nearest Pennsylvania Line Ticket Agent, or address F. Van Dusen, Chief Assistant General Passenger Agent.

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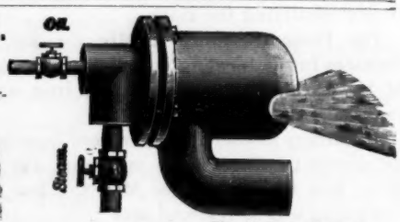

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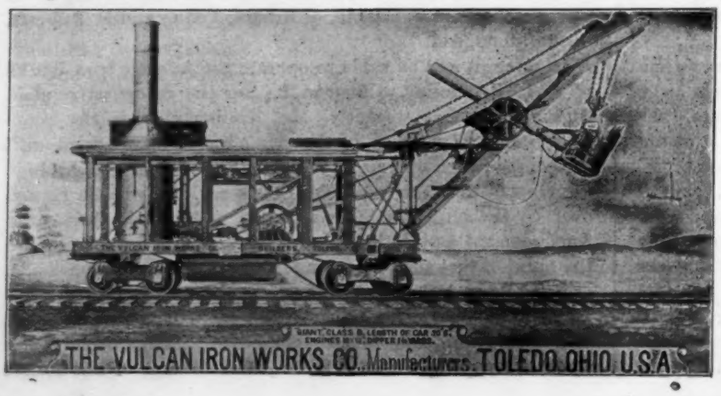

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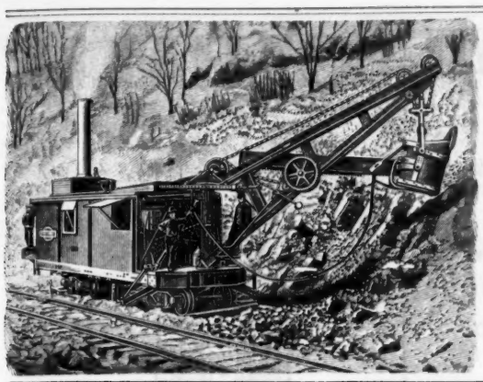
Our "Giant" has the record on the Mesabi Range.



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GOLD SAVING MACHINERY	For Placer Mining. With steam shovels and appliances for disposal of tailings.
WRECKING CRANES	Hand or Steam, 5 to 35 tons capacity. Also Locomotive Cranes and Pile-Drivers.
CENTRIFUGAL DREDGING PUMPS	6-inch to 36-inch. With either simple, compound or triple engines.

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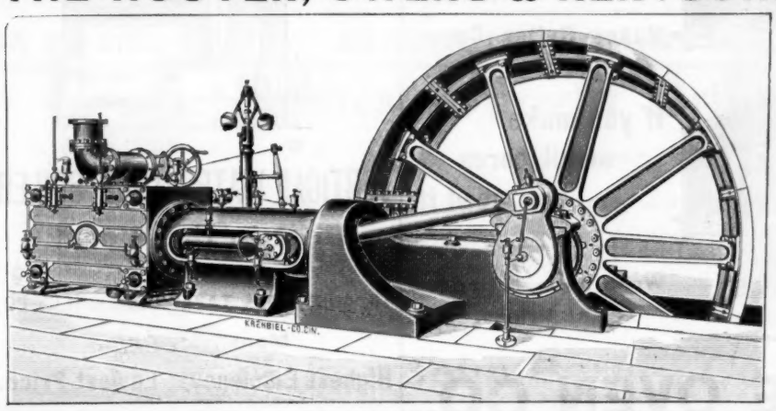
THE HOOVEN, OWENS & RENTSCHLER CO., Hamilton, O.



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Engines for Rolling Mills, Electric Railways and Electric Light.

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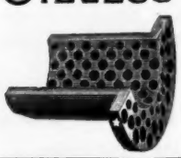

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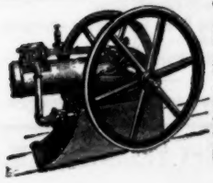

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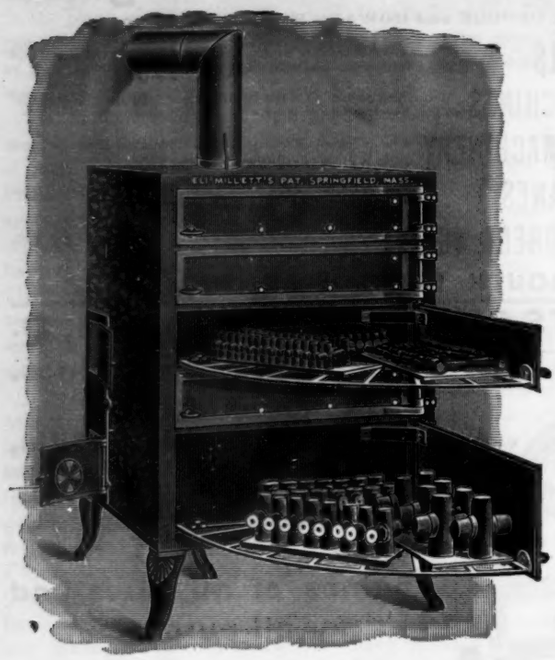

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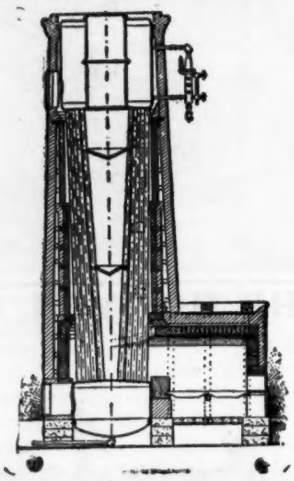

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One Iron Planer 60″x60″x20′, 2 heads.
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One Engine Lathe 60″x18′ 6″ bed, new, Pond make
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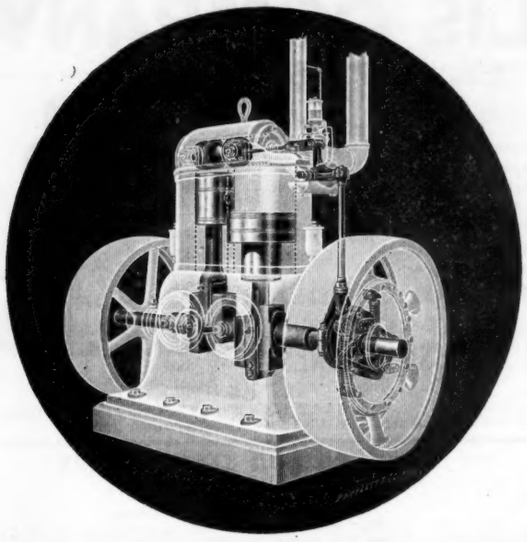

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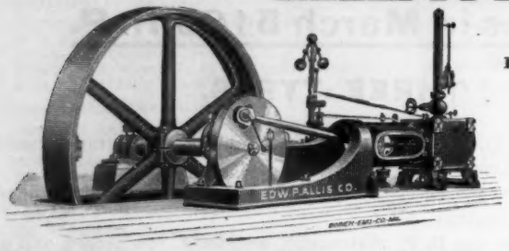

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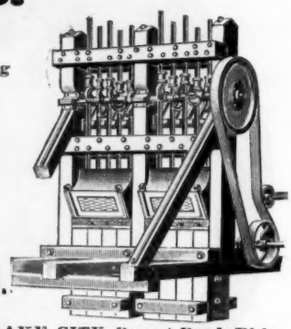

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Moore Mfg. & Foundry Co.	18
*Moyes, L. M.	—
Newell Bros.	1
New York Machinery Depot	19
North American Metaline Co.	17
Oak Hill Fire Brick & Coal Co.	24
Oglebay, Norton & Co.	25
Ohio Sand Co.	28
Otto Gas Engine Co.	28
Parker, Richard A.	27
Pen Argyl Iron Works	27
Pittman, C. K.	2
Pollock, Wm. B. & Co.	2
Pope, E. C.	25
Prentiss Tool & Supply Co.	19
Q. & C. Co	28
Reese, Hammond & Co.	28
Rhoads & Sons	17
‖Sharon Fire Brick Works	1
Sharpless & Winchell	21
Shaw, Willis	16
Shiffler Bridge Co.	25
†Springfield Cupola Co.	—
Stevens, F. B.	28
Stilwell-Bierce & Smith-Vaile Co.	2
Stowe, Fuller & Co.	15
Sturtevant Co., B, F.	2
Swarts Metal Co	1
Sykes Iron Roofing Co.	18
†Tabor Mfg. Co.	—
Tanite Co.	28
Taylor & Boggis Foundry Co.	1
Thurman Fuel Oil Burner Co.	16
Timolat, J. G.	19
Tod, Wm. & Co.	26
Toledo Machine & Tool Co.	27
Totten & Hogg I. & S. F'dry Co.	24
Union Mining Co.	15
†United States Graphite Co.	—
United States Heater Co.	28
Upson Nut Co.	19
Vulcan Iron Works	16
Warren, Webster & Co.	27
Wertheim, Ed.	1
Westinghouse Machine Co.	21
Westmoreland Fire Brick Co.	23
Wheeler Boiler Co.	26

$2.50 CLEVELAND TO BUFFALO

Via "C. & B. LINE,"

Commencing with opening of navigation (about April 1st). Magnificent side-wheel steel steamers

"State of Ohio" and "State of New York."

DAILY TIME TABLE.

SUNDAY INCLUDED.

Lv. Cleveland, 6:00 P.M. | Lv. Buffalo, 6:30 P.M.
Ar. Buffalo, 7:30 A.M. | Ar. Cleveland, 7:30 A.M.

CENTRAL STANDARD TIME.

Take the "C. & B Line" steamers and enjoy a refreshing night's rest when enroute to **Buffalo, Niagara Falls, Toronto, New York, Boston, Albany, 1,000 Islands,** or any Eastern or Canadian point.

Cheap Excursions Weekly to Niagara Falls.

Send 4 cents postage for tourist pamphlet.

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Cleveland, O.

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STEAM AND HYDRAULIC MACHINERY.
DESIGNING FOR
Steel Works, Rolling Mills and Blast Furnaces
A SPECIALTY.
1436 Monadnock, - - CHICAGO.

"THE IRON TRADE REVIEW"

is an increasingly valuable medium through which to sell equipment to machine shops and foundries.

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	3.05@ 3.40
No. 1 Bessemer hematite	2.90@ 3.00
Hematites No. 1 non-Bessemer	2.00@ 2.55
No 1. Specular, non-Bessemer	2.35@ 2.75

PIG IRON.

CLEVELAND (f. o. b. cars):

Bessemer	$10 95@$10 85
No. 1 Strong Foundry	10 75@ 11 00
No. 2 Strong Foundry	9 75@ 10 00
No. 1 Gray Forge, red short	9 25@ 0 00
No. 2 Gray Forge, neutral	9 00@ 00 00
No. 1 American Scotch	11 00@ 00 00
No. 2 American Scotch	10 00@ 00 00
Lake Superior Charcoal	13 00@ 13 50

PITTSBURG:

No. 1 Foundry	$10 75@$11 25
No. 2 Foundry	10 00@ 10 25
Gray Forge	9 25@ 0 00
White and Mottled	9 00@ 0 00
Warm Blast Charcoal	17 00@ 18 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	10 75@ 10 85

CHICAGO (reported by our representative:)

Lake Superior Charcoal	$13 00@$13 50
Local Coke Foundry No. 1	10 50@ 10 75
Local Coke Foundry No. 2	10 25@ 10 50
Local Coke Foundry No. 3	9 75@ 10 25
Local Scotch Foundry No. 1	10 50@ 10 75
Local Scotch Foundry No. 2	10 25@ 10 50
Local Scotch Foundry No. 3	9 75@ 10 25
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 00@ 10 25
Southern Coke No. 3	9 50@ 9 75
Southern No. 1 Soft	10 00@ 10 25
Southern No. 2 Soft	9 75@ 10 00
Southern Silveries No. 1	11 75@ 12 00
Southern Silveries No. 2	11 50@ 11 75
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	13 00@ 13 50
Alabama Car Wheel	17 50@ 18 00
Malleable Bessemer	11 25@ 11 50
Coke Bessemer	11 50@ 12 00

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$ 9 50@$10 00
Southern Coke No. 2 and No. 1 Soft	9 00@ 9 25
Hanging Rock Coke, No 1	11 50@ 12 00
Hanging Rock Charcoal No. 1, Fdy	15 00@ 16 50
Tennessee Charcoal No 1	13 00@ 14 00
Jackson County Stone Coal No 1	14 00@ 14 50
Southern Coke, Gray Forge	8 25@ 8 50
" " Mottled	8 00@ 8 25
Standard Alabama Car Wheel	15 00@ 16 00
Tennessee " "	14 50@ 15 00
Lake Superior " "	13 50@ 14 00

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	Gross Tons
Old iron rails	$12 50
Old steel rails	10 00
	Net Tons
No. 1 R. R. wrought scrap	$ 9 00
No. 1 wrought scrap	8 00
No. 1 Machine cast scrap	8 00
Iron axles	14 50
Axle turnings	7 50
Wrought turnings (free from cast)	6 50
Cast borings	5 50
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 50
Pipes and flues (clean)	7 00
Tank iron	7 50
Hoop and band iron	6 00
Sheet iron	5 50
Wrought drillings	6 50
Malleable iron	8 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.30c@1.35c
Angles	1.20c@1.25c
Tees	1.35c@1.45c
Universal Plates	1.20c
Sheared Plates	1.30c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 10
1¼ to 6 by ⅜ to 1 inch	1 15
1¾ to 6 by 1⅛ to 2 inch	1 30
1¼ & 1⅜ by ⅜ to ¾ inch	1 15
1 & 1⅛ by ⅜ to ¾ inch	1 20
⅛, ¼, ⅛, by ⅜ to ⅝ inch	1 30

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

THE CADY MFG. CO.

283 W. River St., CLEVELAND, O.

SEND FOR OUR NEW CATALOGUE OF Power Presses, Drop Hammers, Punches and Shears, Wire Working and Special Machinery.

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PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.

THE ROBERT AITCHISON. PERFORATED METAL CO.,

OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

Splice Bar Punch. 1

—THE—

Long & Allstatter Co.

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Manufacturers of Belt, Steam and Electrically driven

POWER PUNCHES and SHEARS,

for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc. Send for Catalogue.

A. H. LEITCH, PREST. JOHN C. LEITCH, SEC. AND TREAS.

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MANUFACTURERS OF HIGH GRADE FIRE BRICKS.

PITTSBURG, PA.

Works and Mines, Westmoreland, Pa.

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DIXON'S PERFECT LUBRICATING GRAPHITE.

The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease

NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.

An Interesting and Instructive Pamphlet will be sent Free of Charge.

JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,

CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅞ inch	1 10
2 to 2⅝ inch	1 20
2¾ to 3¼ inch	1 35
3⅜ to 4 inch	1 60
4¼ to 4½ inch	2 20
4¾ to 5 inch	2 40

Oval.

⅞ to 1¼ inch	1 30
⅝ to ¾ inch	1 30
½	1 50
⅜	1 70

Half Oval and Half Round.

1½ to 3 inch	1 65
⅞ to 1⅛ inch	1 45
⅝ to ¾ inch	1 70
½	1 85
⅜	2 95

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 20
1 to 1⅜ by ¼ and 5-16 inch	1 25
¼ to ⅜ by ¼ and 5-16 inch	1 35
⅛ to ⅝ by ¼ and 5-16 inch	1 60

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 65
1 7-16 to 2, No. 17, 18 and 19	1 70
1 7-16 to 2, No. 20	1 80
1 7-16 to 2, No. 21	1 90
1 7-16 to 2, No. 22	2 00
1⅛ to 1⅜, No. 13, 14 and 15	1 70
1⅛ to 1⅜, No. 16, 17 and 18	1 75
1⅛ to 1⅜, No 19 and 20	1 80
1⅛ to 1⅜, No. 21	1 90
1⅛ to 1⅜, No. 22	2 00
15-16 and 1 inch, No. 13, 14 and 15	1 65
15-16 and 1 inch, No. 16, 17 and 18	1 80
15-16 and 1 inch, No. 19 and 20	1 90
15-16 and 1 inch, No. 21	2 00
15-16 and 1 inch, No. 22	2 10
⅞, No. 13, 14 and 15	1 90
⅞, No. 16, 17 and 18	2 00
⅞, No. 19 and 20	2 10
⅞, No. 21	2 20
⅞, No. 22	2 30
13-16, No. 13, 14 and 15	2 00
13-16, No. 16, 17 and 18	2 10
13-16, No. 19 and 20	2 20
13-16 No. 21	2 30
13-16, No. 22	2 40
¾, No. 13, 14 and 15	2 10
¾, No. 16, 17 and 18	2 25
¾, No. 19 and 20	2 35
¾, No. 21	2 45
¾, No. 22	2 55
11-16, No. 13, 14 and 15	2 35
11-16, No. 16, 17 and 18	2 40
11-16, No. 19 and 20	2 50
11-16, No. 21	2 60
11-16, No. 22	2 70
11-16, No. 23	2 80
⅝, No. 13, 14 and 15	2 40
⅝, No. 16, 17 and 18	2 50
⅝, No. 19 and 20	2 60
⅝, No. 21	2 70
⅝, No. 22	2 80
⅝, No. 23	2 90
9-16, No. 13, 14 and 15	2 60
9-16, No. 16, 17 and 18	2 70
9-16, No. and 20	2 80
9-16, No. 21	2 90
9-16, No. 22	3 00
9-16, No. 23	3 10
7-16 and ½ inch, No. 13, 14 and 15	2 80
7-16 and ½ inch, No. 16, 17 and 18	2 90
7-16 and ½ inch, No. 19 and 20	3 00
7-16 and ½ inch, No. 21	3 10
7-16 and ½ inch, No. 22	3 20
7-16 and ½ inch, No. 23	3 30
⅜, No. 13, 14 and 15	3 30
⅜, No. 16, 17 and 18	3 40
⅜, No. 19 and 20	3 50
⅜, No. 21	4 80
⅜, No. 22	3 90
⅜, No. 23	4 05

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 40
1½ to 6 by Nos. 11 and 12	1 45
1 to 1⅜ by ⅛ to 3-16 inch	1 45
1 to 1⅜ by Nos. 11 and 12	1 50
⅞ and 13-16 by ⅛ to 3-16 inch	1 60
⅞ and 13-16 by Nos. 11 and 12	1 65
¾ and 11-16 by ⅛ to 3-16 inch	1 70
¾ and 11-16 by Nos. 11 and 12	1 75
⅝ and 9-16 by ⅛ to 3-16 inch	1 85
⅝ and 9-16 by Nos. 11 and 12	1 90
½ by ⅜ to 3-16 inch	2 00
¼ by Nos. 11 and 12	2 05

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 60
⅞ inch, " " " " 13 and 14	1 70
¾ inch, " " " " 11 and 12	1 75
¾ inch, " " " " 13 and 14	1 05

Sheet Iron.

No. 10	1 65
No. 12	1 75
No. 14	1 80
No. 15-17	1 90
No. 18	2 05
No. 20	2 20
No. 22-24	2 30
No. 25 26	2 40
No. 27	2 50

Steel Boiler Plates—1-4 in. and Heavier.

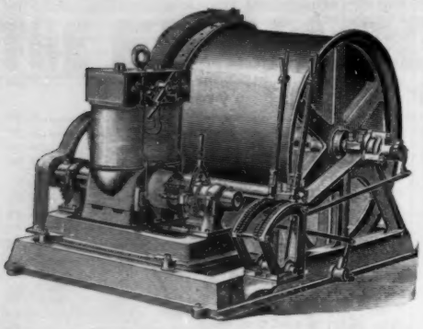
Tank	1 50
Shell	1 70
Flange	1 80
Marine Flange	2 10
Fire Box	3 00

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08½



HOISTING MACHINERY for Mining, Quarrying, Coal Handling, Pile Driving, Bridge Building, Log Hauling and for general Contractors' Use. Improved Electric Hoists, single and double Patent Friction Drum, compound, geared with brakes and reversible for general Hoisting, Mining Purposes and Suspension Cable Ways.

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HOISTING AND CONVEYNG MACHINERY

For moving all kinds of material in Steam Power Stations, Factories, Gas Works, Mines, Coal Yards, etc.

Tip Cars, Wire Rope, Barrows. INDUSTRIAL RAILWAYS.

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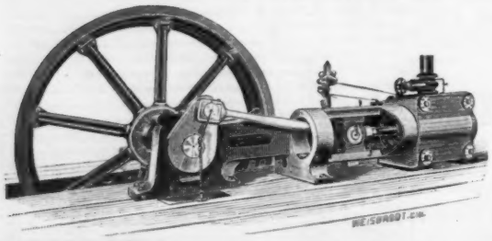
CINCINNATI, OHIO.



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Simple and Compound.

Shafting, Hangers, Pulleys.

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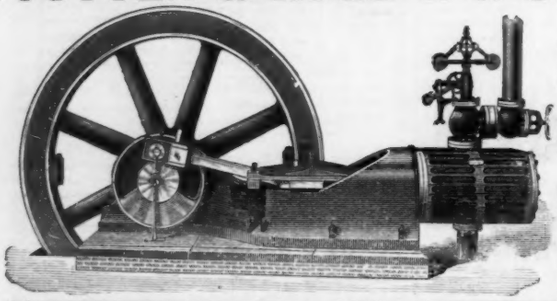

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ENGINE,

Chilled and Sand Rolls and Rolling Mill Machinery.

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Pays special attention to iron ore, blast furnace, rolling mill, foundry and machine shop interests. Per year **$3.00.**

The Most Satisfactory Fire Brick That Money can Buy

Our well known brands

"O. K." Crown, "O. K." and "A"

They have no equal when used for the purpose designated. They are **good, honest, well made** Brick, **made** to hold **your** trade.

"Our Prices Are Just Right."

Oak Hill Fire Brick & Coal Co.,

Manufacturers,

OAK HILL, OHIO.

7-16 to ⅜ and 2⅜ to 3 in.	.09
3⅛ to 4 in.	.09½
⅝ to 11-16 and 4½	.10
⅛ to 6 in.	.10½
⅞ to 9-32 and 6⅛ to 7 in.	.11
7⅛ in	.13

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to ⅜ thick	.8

Bessemer and O. H. Steel.

Machinery	base price,	1 50
Tire	"	1 60
Spring	"	2 10
Sleigh Shoe	"	2 03
Toe Calk	"	2 05
Cutter Shoes, tapered and bent	"	2 10

English Tool Steel.

Jessop's	.15½c
Hobson's "Best"	.15½c
" "Choice"	.35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam.	3 00

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis35
Horton's Universal	dis40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ 1b 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1⅝"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70

SHIFFLER BRIDGE COMPANY,

BUILDING DEPARTMENT.

SPECIALTIES: STEEL AND IRON BUILDINGS FOR ROLLING MILLS, TIN PLATE PLANTS, STEEL WORKS, FOUNDRIES, FACTORIES, ROOF TRUSSES, GIRDERS, COLUMNS, BEAMS, CORRUGATED IRON, ETC.

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On your castings that you want emoved?

If SO,

The ACME CHEMICAL SOLUTION. TRADE MARK. C.C.S.MNF'G.CO. FOR CLEANING METAL CASTINGS & THE SURFACES OF METALS.

Will clean them better than any other method.

Try It.

Chicago Chemical Solution Mfg. Co.
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Cleveland Union Station.

Pennsylvania Lines.

Foot of Bank Street.

TICKET OFFICES at Station, Euclid Av., Woodland Av., and Weddell House corner.

THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
* Daily. † Daily, except Sunday.

FROM CLEVELAND TO	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	12:45 pm	*12:10 pm
Akron and Orrville	† 3:25 pm	† 9.50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

Saturdays the 8:00 pm train will leave at 11:20 pm.

Valley Ry.

Depot foot of So. Water St.
City Office 137 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:30 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:30 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		†6:30 P M
Akron, Canton & Marietta	†2:45 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†2:45 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Drawing Room cars between Cleveland and Chicago.

THE ARMSTRONG
LATHE and PLANER TOOL
Saves all Blacksmith Work.
90% Tool Steel. 60% Grinding
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If you are seeking a new location it will pay you well to investigate the merits of our proposition

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Iron Ore, Pig Iron
AND METALS.
Cleveland, - Ohio.

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MAKERS OF
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Office and Warerooms, 28 Columbus St.
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THE CONDIT-FULLER CO.,

Pig and Bar Iron,
CLEVELAND, . OHIO.

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Successors to Tuttle, Oglebay & Co.
Commission Dealers in
IRON ORES,
FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS.
CLEVELAND, OHIO.

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Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs.....12c
" " " " over 5 lbs.....10c

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Illinois Bolt Co. list.....dis 75

Nuts and Washers.

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Washers	9	8	7	5	4½	4½	4½

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Brass and Copper.....dis 50
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Split Wood Pulleys.....dis 55@60

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Moore's Anti-Friction Diferential Chain Pulley Block.....dis 20

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Iron, Thousand, list November 1, 1894.....dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894.....dis 60@65
Copper.....dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Apr. 9, 1894

Brass.....dis 40
Copper.....dis 40
Bright and annealed, Nos. 0@18.....dis 70&10@75
" " Nos. 19@26.....dis 75@75& 5
" " Nos. 27@36.....dis 75&10& 5
Coppered Nos. 0 to 18, market list.....dis 70@70& 5
Galvanized Nos. 0 to 18 " " .....dis65& 5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....95c ℔ lb dis 30

Wrenches.

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Girard Standard.....dis 70&10
Agricultural.....dis 75&10
Mechanic's.....dis 55&10& 5
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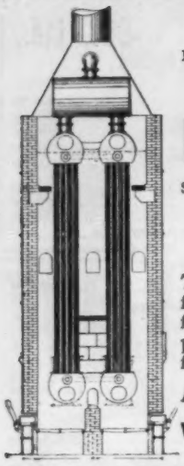

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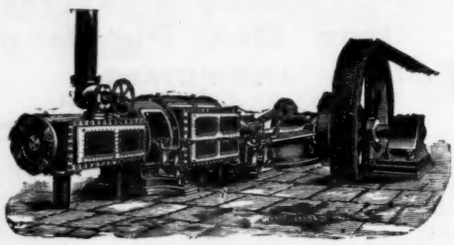

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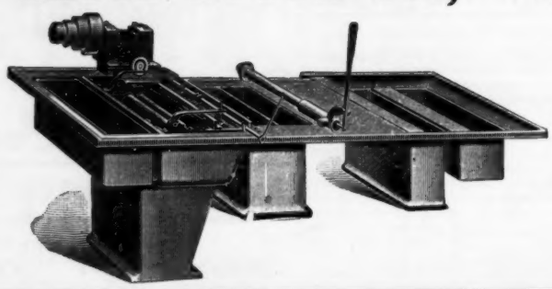

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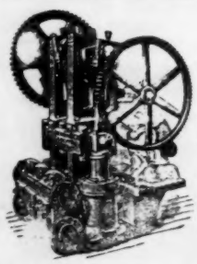

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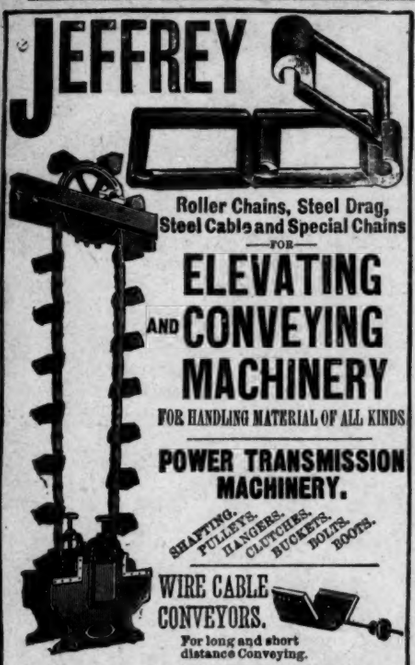

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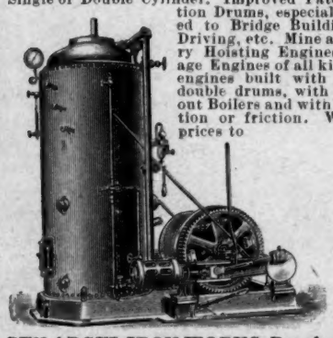

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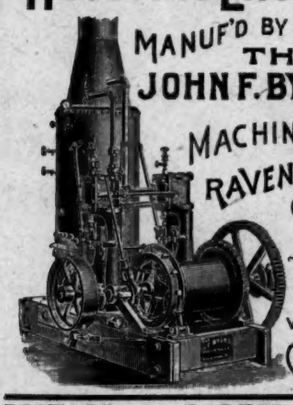

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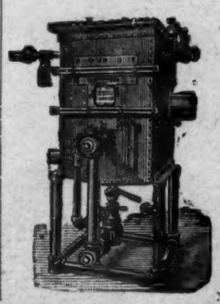

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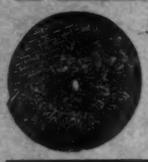

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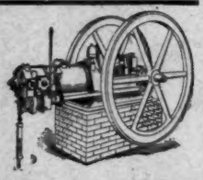

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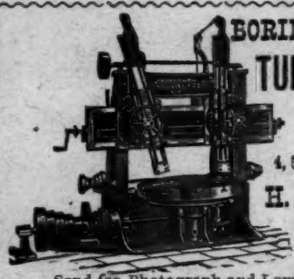

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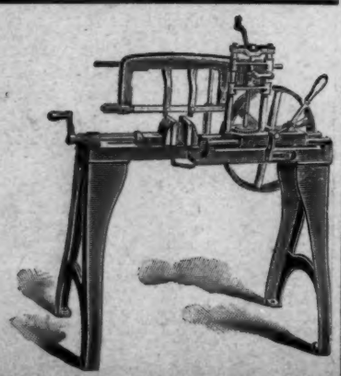

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